

20-1025 (Lead); 20-1138 (Consolidated)

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**UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

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ENVIRONMENTAL HEALTH TRUST; CONSUMERS FOR SAFE CELL  
PHONES; ELIZABETH BARRIS; THEODORA SCARATO

CHILDREN'S HEALTH DEFENSE; MICHELE HERTZ; PETRA BROKKEN;  
DR. DAVID O. CARPENTER; DR. PAUL DART; DR. TORIL H. JELTER; DR.  
ANN LEE; VIRGINIA FARVER, JENNIFER BARAN; PAUL STANLEY, M.Ed.

*Petitioners*

v.

FEDERAL COMMUNICATIONS COMMISSION;  
UNITED STATES OF AMERICA

*Respondents*

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Petition for Review of Order Issued by the  
Federal Communications Commission

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**PETITIONERS' JOINT OPENING BRIEF ADDENDUM VOLUME I  
(PAGES AD\_00001-AD\_00115)**

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## **STATUTES AND REGULATIONS**

## **STATUTES**

### **FEDERAL STATUTES**

## 42 U.S.C. §4331

**§ 4331. Congressional declaration of national environmental policy**

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(a) The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

(b) In order to carry out the policy set forth in this Act [[42 USCS §§ 4321](#) et seq.], it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—

- (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- (2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
- (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

(c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.

## 42 U.S.C. §4332

**§ 4332. Cooperation of agencies; reports; availability of information; recommendations; international and national coordination of efforts**

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The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act [[42 USCS §§ 4321](#) et seq.], and (2) all agencies of the Federal Government shall—

- (A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment;
- (B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act [[42 USCS §§ 4341](#) et seq.], which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations;
- (C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—
  - (i) the environmental impact of the proposed action,
  - (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
  - (iii) alternatives to the proposed action,
  - (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
  - (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by [section 552 of title 5, United States Code](#), and shall accompany the proposal through the existing agency review processes;

(D) Any detailed statement required under subparagraph (C) after January 1, 1970, for any major Federal action funded under a program of grants to States shall not be deemed to be legally insufficient solely by reason of having been prepared by a State agency or official, if:

- (i) the State agency or official has statewide jurisdiction and has the responsibility for such action,
- (ii) the responsible Federal official furnishes guidance and participates in such preparation,



(iii) the responsible Federal official independently evaluates such statement prior to its approval and adoption, and

(iv) after January 1, 1976, the responsible Federal official provides early notification to, and solicits the views of, any other State or any Federal land management entity of any action or any alternative thereto which may have significant impacts upon such State or affected Federal land management entity and, if there is any disagreement on such impacts, prepares a written assessment of such impacts and views for incorporation into such detailed statement.

The procedures in this subparagraph shall not relieve the Federal official of his responsibilities for the scope, objectivity, and content of the entire statement or of any other responsibility under this Act [[42 USCS §§ 4321](#) et seq.]; and further, this subparagraph does not affect the legal sufficiency of statements prepared by State agencies with less than statewide jurisdiction. [;]

(E) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(F) recognize the worldwide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment;

(G) make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment;

(H) initiate and utilize ecological information in the planning and development of resource-oriented projects; and

(I) assist the Council on Environmental Quality established by title II of this Act [[42 USCS §§ 4341](#) et seq.].

## 47 U.S.C. §151

**§ 151. Purposes of Act; Federal Communications Commission created**

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For the purpose of regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States, without discrimination on the basis of race, color, religion, national origin, or sex, a rapid, efficient, nationwide, and world-wide wire and radio communication service with adequate facilities at reasonable charges, for the purpose of national defense, for the purpose of promoting safety of life and property through the use of wire and radio communication, and for the purpose of securing a more effective execution of this policy by centralizing authority heretofore granted by law to several agencies and by granting additional authority with respect to interstate and foreign commerce in wire and radio communication, there is hereby created a commission to be known as the "Federal Communications Commission", which shall be constituted as hereinafter provided, and which shall execute and enforce the provisions of this Act.

## 47 U.S.C. §152

**§ 152. Application of Act**

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(a) The provisions of this Act shall apply to all interstate and foreign communication by wire or radio and all interstate and foreign transmission of energy by radio, which originates and/or is received within the United States, and to all persons engaged within the United States in such communication or such transmission of energy by radio, and to the licensing and regulating of all radio stations as hereinafter provided; but it shall not apply to persons engaged in wire or radio communication or transmission in [the Philippine Islands or] the Canal Zone, or to wire or radio communication or transmission wholly within [the Philippine Islands or] the Canal Zone. The provisions of this Act shall apply with respect to cable service, to all persons engaged within the United States in providing such service, and to the facilities of cable operators which relate to such service, as provided in title VI [[47 USCS §§ 521](#) et seq.].

(b) Except as provided in sections 223 through 227 [[47 USCS §§ 223–227](#)], inclusive, and section 332 [[47 USCS § 332](#)], and subject to the provisions of section 301 [[47 USCS § 301](#)] and Title VI [[47 USCS §§ 521](#) et seq.], nothing in this Act shall be construed to apply or to give the Commission jurisdiction with respect to (1) charges, classifications, practices, services, facilities, or regulations for or in connection with intrastate communication service by wire or radio of any carrier, or (2) any carrier engaged in interstate or foreign communication solely through physical connection with the facilities of another carrier not directly or indirectly controlling or controlled by, or under direct or indirect common control with such carrier, or (3) any carrier engaged in interstate or foreign communication solely through connection by radio or by wire and radio, with facilities, located in an adjoining State or in Canada or Mexico (where they adjoin the State in which the carrier is doing business), of another carrier not directly or indirectly controlling or controlled by, or under direct or indirect common control with such carrier, or (4) any carrier to which clause (2) or clause (3) would be applicable except for furnishing interstate mobile radio communication service or radio communication service to mobile stations on land vehicles in Canada or Mexico; except that sections 201 through 205 of this Act, both inclusive [[47 USCS §§ 201–205](#)], shall, except as otherwise provided therein, apply to carriers described in clauses (2), (3), and (4).

## 47 U.S.C. §154

**§ 154. Federal Communications Commission**

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**(a) Number of commissioners; appointment.** The Federal Communications Commission (in this Act referred to as the “Commission”) shall be composed of five commissioners appointed by the President, by and with the advice and consent of the Senate, one of whom the President shall designate as chairman.

**(b) Qualifications.**

(1) Each member of the Commission shall be a citizen of the United States.

(2)

**(A)** No member of the Commission or person employed by the Commission shall—

**(i)** be financially interested in any company or other entity engaged in the manufacture or sale of telecommunications equipment which is subject to regulation by the Commission;

**(ii)** be financially interested in any company or other entity engaged in the business of communication by wire or radio or in the use of the electromagnetic spectrum;

**(iii)** be financially interested in any company or other entity which controls any company or other entity specified in clause (i) or clause (ii), or which derives a significant portion of its total income from ownership of stocks, bonds, or other securities of any such company or other entity; or

**(iv)** be employed by, hold any official relation to, or own any stocks, bonds, or other securities of, any person significantly regulated by the Commission under this Act;

except that the prohibitions established in this subparagraph shall apply only to financial interests in any company or other entity which has a significant interest in communications, manufacturing, or sales activities which are subject to regulation by the Commission.

**(B)**

**(i)** The Commission shall have authority to waive, from time to time, the application of the prohibitions established in subparagraph (A) to persons employed by the Commission if the Commission determines that the financial interests of a person which are involved in a particular case are minimal, except that such waiver authority shall be subject to the provisions of [section 208 of title 18, United States Code](#). The waiver authority established in this subparagraph shall not apply with respect to members of the Commission.

**(ii)** In any case in which the Commission exercises the waiver authority established in this subparagraph, the Commission shall publish notice of such action in the Federal Register.

**(3)** The Commission, in determining whether a company or other entity has a significant interest in communications, manufacturing, or sales activities which are subject to regulation by the Commission, shall consider (without excluding other relevant factors)—

(A) the revenues, investments, profits, and managerial efforts directed to the related communications, manufacturing, or sales activities of the company or other entity involved, as compared to the other aspects of the business of such company or other entity;

(B) the extent to which the Commission regulates and oversees the activities of such company or other entity;

(C) the degree to which the economic interests of such company or other entity may be affected by any action of the Commission; and

(D) the perceptions held by the public regarding the business activities of such company or other entity.

(4) Members of the Commission shall not engage in any other business, vocation, profession, or employment while serving as such members.

(5) The maximum number of commissioners who may be members of the same political party shall be a number equal to the least number of commissioners which constitute a majority of the full membership of the Commission.

**(c) Terms of office and vacancies.**

(1) A commissioner—

(A) shall be appointed for a term of 5 years;

(B) except as provided in subparagraph (C), may continue to serve after the expiration of the fixed term of office of the commissioner until a successor is appointed and has been confirmed and taken the oath of office; and

(C) may not continue to serve after the expiration of the session of Congress that begins after the expiration of the fixed term of office of the commissioner.

(2) Any person chosen to fill a vacancy in the Commission—

(A) shall be appointed for the unexpired term of the commissioner that the person succeeds;

(B) except as provided in subparagraph (C), may continue to serve after the expiration of the fixed term of office of the commissioner that the person succeeds until a successor is appointed and has been confirmed and taken the oath of office; and

(C) may not continue to serve after the expiration of the session of Congress that begins after the expiration of the fixed term of office of the commissioner that the person succeeds.

(3) No vacancy in the Commission shall impair the right of the remaining commissioners to exercise all the powers of the Commission.

**(d) Compensation of Commission members.** Each Commissioner shall receive an annual salary at the annual rate payable from time to time for level IV of the Executive Schedule [[5 USCS § 5315](#)], payable in monthly installments. The Chairman of the Commission, during the period of his service as Chairman, shall receive an annual salary at the annual rate payable from time to time for level III of the Executive Schedule [[5 USCS § 5314](#)].

**(e) Principal office; special sessions.** The principal office of the Commission shall be in the District of Columbia, where its general sessions shall be held; but whenever the convenience of

the public or of the parties may be promoted or delay or expense prevented thereby, the Commission may hold special sessions in any part of the United States.

**(f) Employees and assistants; compensation of members of Field Engineering and Monitoring Bureau; use of amateur volunteers for certain purposes; commercial radio operator examinations.**

(1) The Commission shall have authority, subject to the provisions of the civil-service laws and the Classification Act of 1949, as amended [[5 USCS §§ 5101](#) et seq. and [§§ 5331](#) et seq.], to appoint such officers, engineers, accountants, attorneys, inspectors, examiners, and other employees as are necessary in the exercise of its functions.

(2) Without regard to the civil-service laws, but subject to the Classification Act of 1949 [[5 USCS §§ 5101](#) et seq. and [§§ 5331](#) et seq.], each commissioner may appoint three professional assistants and a secretary, each of whom shall perform such duties as such commissioner shall direct. In addition, the chairman of the Commission may appoint, without regard to the civil-service laws, but subject to the Classification Act of 1949, an administrative assistant who shall perform such duties as the chairman shall direct.

(3) The Commission shall fix a reasonable rate of extra compensation for overtime services of engineers in charge and radio engineers of the Field Engineering and Monitoring Bureau of the Federal Communications Commission, who may be required to remain on duty between the hours of 5 o'clock postmeridian and 8 o'clock antemeridian or on Sundays or holidays to perform services in connection with the inspection of ship radio equipment and apparatus for the purposes of part II of title III of this Act [[47 USCS §§ 351](#) et seq.] or the Great Lakes Agreement, on the basis of one-half day's additional pay for each two hours or fraction thereof of at least one hour that the overtime extends beyond 5 o'clock postmeridian (but not to exceed two and one-half days' pay for the full period from 5 o'clock postmeridian to 8 o'clock antemeridian) and two additional days' pay for Sunday or holiday duty. The said extra compensation for overtime services shall be paid by the master, owner, or agent of such vessel to the local United States collector of customs [Secretary of the Treasury] or his representative, who shall deposit such collection into the Treasury of the United States to an appropriately designated receipt account: *Provided*, That the amounts of such collections received by the said collector of customs or his representatives shall be covered into the Treasury as miscellaneous receipts; and the payments of such extra compensation to the several employees entitled thereto shall be made from the annual appropriations for salaries and expenses of the Commission: *Provided further*, That to the extent that the annual appropriations which are hereby authorized to be made from the general fund of the Treasury are insufficient, there are hereby authorized to be appropriated from the general fund of the Treasury such additional amounts as may be necessary to the extent that the amounts of such receipts are in excess of the amounts appropriated: *Provided further*, That such extra compensation shall be paid if such field employees have been ordered to report for duty and have so reported whether the actual inspection of the radio equipment or apparatus takes place or not: *And provided further*, That in those ports where customary working hours are other than those hereinabove mentioned, the engineers in charge are vested with authority to regulate the hours of such employees so as to agree with prevailing working hours in said ports where inspections are to be made, but nothing contained in this proviso shall be construed in any manner to alter the length of a working day for the engineers in charge and radio engineers or the overtime pay herein fixed: and *Provided further*, That, in the alternative, an entity designated by the Commission may make the inspections referred to in this paragraph.

**(4)**

**(A)** The Commission, for purposes of preparing or administering any examination for an amateur station operator license, may accept and employ the voluntary and uncompensated services of any individual who holds an amateur station operation license of a higher class than the class of license for which the examination is being prepared or administered. In the case of examinations for the highest class of amateur station operator license, the Commission may accept and employ such services of any individual who holds such class of license.

**(B)**

**(i)** The Commission, for purposes of monitoring violations of any provision of this Act (and of any regulation prescribed by the Commission under this Act) relating to the amateur radio service, may—

**(I)** recruit and train any individual licensed by the Commission to operate an amateur station; and

**(II)** accept and employ the voluntary and uncompensated services of such individual.

**(ii)** The Commission, for purposes of recruiting and training individuals under clause (i) and for purposes of screening, annotating, and summarizing violation reports referred under clause (i), may accept and employ the voluntary and uncompensated services of any amateur station operator organization.

**(iii)** The functions of individuals recruited and trained under this subparagraph shall be limited to—

**(I)** the detection of improper amateur radio transmissions;

**(II)** the conveyance to Commission personnel of information which is essential to the enforcement of this Act (or regulations prescribed by the Commission under this Act) relating to the amateur radio service; and

**(III)** issuing advisory notices, under the general direction of the Commission, to persons who apparently have violated any provision of this Act (or regulations prescribed by the Commission under this Act) relating to the amateur radio service.

Nothing in this clause shall be construed to grant individuals recruited and trained under this subparagraph any authority to issue sanctions to violators or to take any enforcement action other than any action which the Commission may prescribe by rule.

**(C)**

**(i)** The Commission, for purposes of monitoring violations of any provision of this Act (and of any regulation prescribed by the Commission under this Act) relating to the citizens band radio service, may—

**(I)** recruit and train any citizens band radio operator; and

**(II)** accept and employ the voluntary and uncompensated services of such operator.

(ii) The Commission, for purposes of recruiting and training individuals under clause (i) and for purposes of screening, annotating, and summarizing violation reports referred under clause (i), may accept and employ the voluntary and uncompensated services of any citizens band radio operator organization. The Commission, in accepting and employing services of individuals under this subparagraph, shall seek to achieve a broad representation of individuals and organizations interested in citizens band radio operation.

(iii) The functions of individuals recruited and trained under this subparagraph shall be limited to—

(I) the detection of improper citizens band radio transmissions;

(II) the conveyance to Commission personnel of information which is essential to the enforcement of this Act (or regulations prescribed by the Commission under this Act) relating to the citizens band radio service; and

(III) issuing advisory notices, under the general direction of the Commission, to persons who apparently have violated any provision of this Act (or regulations prescribed by the Commission under this Act) relating to the citizens band radio service.

Nothing in this clause shall be construed to grant individuals recruited and trained under this subparagraph any authority to issue sanctions to violators or to take any enforcement action other than any action which the Commission may prescribe by rule.

(D) The Commission shall have the authority to endorse certification of individuals to perform transmitter installation, operation, maintenance, and repair duties in the private land mobile services and fixed services (as defined by the Commission by rule) if such certification programs are conducted by organizations or committees which are representative of the users in those services and which consist of individuals who are not officers or employees of the Federal Government.

(E) The authority of the Commission established in this paragraph shall not be subject to or affected by the provisions of part III of title 5, United States Code [[5 USCS §§ 2101](#) et seq.], or section 3679(b) of the Revised Statutes (31 U.S.C. 665(b) [[31 USCS § 1342](#)]).

(F) Any person who provides services under this paragraph shall not be considered, by reason of having provided such services, a Federal employee.

(G) The Commission, in accepting and employing services of individuals under subparagraphs (A) and (B), shall seek to achieve a broad representation of individuals and organizations interested in amateur station operation.

(H) The Commission may establish rules of conduct and other regulations governing the service of individuals under this paragraph.

(I) With respect to the acceptance of voluntary uncompensated services for the preparation, processing, or administration of examinations for amateur station operator licenses pursuant to subparagraph (A) of this paragraph, individuals, or organizations which provide or coordinate such authorized volunteer services may recover from examinees reimbursement for out-of-pocket costs.

(5)



(A) The Commission, for purposes of preparing and administering any examination for a commercial radio operator license or endorsement, may accept and employ the services of persons that the Commission determines to be qualified. Any person so employed may not receive compensation for such services, but may recover from examinees such fees as the Commission permits, considering such factors as public service and cost estimates submitted by such person.

(B) The Commission may prescribe regulations to select, oversee, sanction, and dismiss any person authorized under this paragraph to be employed by the Commission.

(C) Any person who provides services under this paragraph or who provides goods in connection with such services shall not, by reason of having provided such service or goods, be considered a Federal or special government employee.

**(g) Expenditures.**

(1) The Commission may make such expenditures (including expenditures for rent and personal services at the seat of government and elsewhere, for office supplies, law books, periodicals, and books of reference, for printing and binding, for land for use as sites for radio monitoring stations and related facilities, including living quarters where necessary in remote areas, for the construction of such stations and facilities, and for the improvement, furnishing, equipping, and repairing of such stations and facilities and of laboratories and other related facilities (including construction of minor subsidiary buildings and structures not exceeding \$25,000 in any one instance) used in connection with technical research activities, as may be necessary for the execution of the functions vested in the Commission and as may be appropriated for by the Congress in accordance with the authorizations of appropriations established in section 6 [\[47 USCS § 156\]](#). All expenditures of the Commission, including all necessary expenses for transportation incurred by the commissioners or by their employees, under their orders, in making any investigation or upon any official business in any other places than in the city of Washington, shall be allowed and paid on the presentation of itemized vouchers therefor approved by the chairman of the Commission or by such other member or officer thereof as may be designated by the Commission for that purpose.

(2) [Deleted]

(3)

(A) Notwithstanding any other provision of law, in furtherance of its functions the Commission is authorized to accept, hold, administer, and use unconditional gifts, donations, and bequests of real, personal, and other property (including voluntary and uncompensated services, as authorized by [section 3109 of title 5, United States Code](#)).

(B) The Commission, for purposes of providing radio club and military-recreational call signs, may utilize the voluntary, uncompensated, and unreimbursed services of amateur radio organizations authorized by the Commission that have tax-exempt status under [section 501\(c\)\(3\) of the Internal Revenue Code of 1986](#) [\[26 USCS § 501\(c\)\(3\)\]](#).

(C) For the purpose of Federal law on income taxes, estate taxes, and gift taxes, property or services accepted under the authority of subparagraph (A) shall be deemed to be a gift, bequest, or devise to the United States.

(D) The Commission shall promulgate regulations to carry out the provisions of this paragraph. Such regulations shall include provisions to preclude the acceptance of any gift, bequest, or donation that would create a conflict of interest or the appearance of a conflict of interest.

**(h) Quorum; seal.** Three members of the Commission shall constitute a quorum thereof. The Commission shall have an official seal which shall be judicially noticed.

**(i) Duties and powers.** The Commission may perform any and all acts, make such rules and regulations, and issue such orders, not inconsistent with this Act, as may be necessary in the execution of its functions.

**(j) Conduct of proceedings; hearings.** The Commission may conduct its proceedings in such manner as will best conduce to the proper dispatch of business and to the ends of justice. No commissioner shall participate in any hearing or proceeding in which he has a pecuniary interest. Any party may appear before the Commission and be heard in person or by attorney. Every vote and official act of the Commission shall be entered of record, and its proceedings shall be public upon the request of any party interested. The Commission is authorized to withhold publication of records or proceedings containing secret information affecting the national defense.

**(k) Record of reports.** All reports of investigations made by the Commission shall be entered of record, and a copy thereof shall be furnished to the party who may have complained, and to any common carrier or licensee that may have been complained of.

**(l) Publication of reports; admissibility as evidence.** The Commission shall provide for the publication of its reports and decisions in such form and manner as may be best adapted for public information and use, and such authorized publications shall be competent evidence of the reports and decisions of the Commission therein contained in all courts of the United States and of the several States without any further proof or authentication thereof.

**(m) Compensation of appointees.** Rates of compensation of persons appointed under this section shall be subject to the reduction applicable to officers and employees of the Federal Government generally.

**(n) Use of communications in safety of life and property.** For the purpose of obtaining maximum effectiveness from the use of radio and wire communications in connection with safety of life and property, the Commission shall investigate and study all phases of the problem and the best methods of obtaining the cooperation and coordination of these systems.

**(o) [Redesignated]**

## 47 U.S.C. §253

**§ 253. Removal of barriers to entry**

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**(a) In general.** No State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.

**(b) State regulatory authority.** Nothing in this section shall affect the ability of a State to impose, on a competitively neutral basis and consistent with section 254 [[47 USCS § 254](#)], requirements necessary to preserve and advance universal service, protect the public safety and welfare, ensure the continued quality of telecommunications services, and safeguard the rights of consumers.

**(c) State and local government authority.** Nothing in this section affects the authority of a State or local government to manage the public rights-of-way or to require fair and reasonable compensation from telecommunications providers, on a competitively neutral and nondiscriminatory basis, for use of public rights-of-way on a nondiscriminatory basis, if the compensation required is publicly disclosed by such government.

**(d) Preemption.** If, after notice and an opportunity for public comment, the Commission determines that a State or local government has permitted or imposed any statute, regulation, or legal requirement that violates subsection (a) or (b), the Commission shall preempt the enforcement of such statute, regulation, or legal requirement to the extent necessary to correct such violation or inconsistency.

**(e) Commercial mobile service providers.** Nothing in this section shall affect the application of section 332(c)(3) [[47 USCS § 332\(c\)\(3\)](#)] to commercial mobile service providers.

**(f) Rural markets.** It shall not be a violation of this section for a State to require a telecommunications carrier that seeks to provide telephone exchange service or exchange access in a service area served by a rural telephone company to meet the requirements in section 214(e)(1) [[47 USCS § 214\(e\)\(1\)](#)] for designation as an eligible telecommunications carrier for that area before being permitted to provide such service. This subsection shall not apply—

(1) to a service area served by a rural telephone company that has obtained an exemption, suspension, or modification of section 251(c)(4) [[47 USCS § 251\(c\)\(4\)](#)] that effectively prevents a competitor from meeting the requirements of section 214(e)(1) [[47 USCS § 214\(e\)\(1\)](#)]; and

(2) to a provider of commercial mobile services.

## 47 U.S.C. §254

**§ 254. Universal service**

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**(a) Procedures to review universal service requirements.**

(1) Federal-State Joint Board on universal service. Within one month after the date of enactment of the Telecommunications Act of 1996 [enacted Feb. 8, 1996], the Commission shall institute and refer to a Federal-State Joint Board under section 410(c) [[47 USCS § 410\(c\)](#)] a proceeding to recommend changes to any of its regulations in order to implement sections 214(e) [[47 USCS § 214\(e\)](#)] and this section, including the definition of the services that are supported by Federal universal service support mechanisms and a specific timetable for completion of such recommendations. In addition to the members of the Joint Board required under section 410(c) [[47 USCS § 410\(c\)](#)], one member of such Joint Board shall be a State-appointed utility consumer advocate nominated by a national organization of State utility consumer advocates. The Joint Board shall, after notice and opportunity for public comment, make its recommendations to the Commission 9 months after the date of enactment of the Telecommunications Act of 1996 [enacted Feb. 8, 1996].

(2) Commission action. The Commission shall initiate a single proceeding to implement the recommendations from the Joint Board required by paragraph (1) and shall complete such proceeding within 15 months after the date of enactment of the Telecommunications Act of 1996 [enacted Feb. 8, 1996]. The rules established by such proceeding shall include a definition of the services that are supported by Federal universal service support mechanisms and a specific timetable for implementation. Thereafter, the Commission shall complete any proceeding to implement subsequent recommendations from any Joint Board on universal service within one year after receiving such recommendations.

**(b) Universal service principles.** The Joint Board and the Commission shall base policies for the preservation and advancement of universal service on the following principles:

(1) Quality and rates. Quality services should be available at just, reasonable, and affordable rates.

(2) Access to advanced services. Access to advanced telecommunications and information services should be provided in all regions of the Nation.

(3) Access in rural and high cost areas. Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas.

(4) Equitable and nondiscriminatory contributions. All providers of telecommunications services should make an equitable and nondiscriminatory contribution to the preservation and advancement of universal service.

(5) Specific and predictable support mechanisms. There should be specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service.

(6) Access to advanced telecommunications services for schools, health care, and libraries. Elementary and secondary schools and classrooms, health care providers, and libraries

should have access to advanced telecommunications services as described in subsection (h).

(7) Additional principles. Such other principles as the Joint Board and the Commission determine are necessary and appropriate for the protection of the public interest, convenience, and necessity and are consistent with this Act [[47 USCS §§ 151](#) et seq.].

**(c) Definition.**

(1) In general. Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services. The Joint Board in recommending, and the Commission in establishing, the definition of the services that are supported by Federal universal service support mechanisms shall consider the extent to which such telecommunications services—

(A) are essential to education, public health, or public safety;

(B) have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers;

(C) are being deployed in public telecommunications networks by telecommunications carriers; and

(D) are consistent with the public interest, convenience, and necessity.

(2) Alterations and modifications. The Joint Board may, from time to time, recommend to the Commission modifications in the definition of the services that are supported by Federal universal service support mechanisms.

(3) Special services. In addition to the services included in the definition of universal service under paragraph (1), the Commission may designate additional services for such support mechanisms for schools, libraries, and health care providers for the purposes of subsection (h).

**(d) Telecommunications carrier contribution.** Every telecommunications carrier that provides interstate telecommunications services shall contribute, on an equitable and nondiscriminatory basis, to the specific, predictable, and sufficient mechanisms established by the Commission to preserve and advance universal service. The Commission may exempt a carrier or class of carriers from this requirement if the carrier's telecommunications activities are limited to such an extent that the level of such carrier's contribution to the preservation and advancement of universal service would be de minimis. Any other provider of interstate telecommunications may be required to contribute to the preservation and advancement of universal service if the public interest so requires.

**(e) Universal service support.** After the date on which Commission regulations implementing this section take effect, only an eligible telecommunications carrier designated under section 214(e) [[47 USCS § 214\(e\)](#)] shall be eligible to receive specific Federal universal service support. A carrier that receives such support shall use that support only for the provision, maintenance, and upgrading of facilities and services for which the support is intended. Any such support should be explicit and sufficient to achieve the purposes of this section.

**(f) State authority.** A State may adopt regulations not inconsistent with the Commission's rules to preserve and advance universal service. Every telecommunications carrier that provides intrastate telecommunications services shall contribute, on an equitable and nondiscriminatory basis, in a manner determined by the State to the preservation and advancement of universal

service in that State. A State may adopt regulations to provide for additional definitions and standards to preserve and advance universal service within that State only to the extent that such regulations adopt additional specific, predictable, and sufficient mechanisms to support such definitions or standards that do not rely on or burden Federal universal service support mechanisms.

**(g) Interexchange and interstate services.** Within 6 months after the date of enactment of the Telecommunications Act of 1996 [enacted Feb. 8, 1996], the Commission shall adopt rules to require that the rates charged by providers of interexchange telecommunications services to subscribers in rural and high cost areas shall be no higher than the rates charged by each such provider to its subscribers in urban areas. Such rules shall also require that a provider of interstate interexchange telecommunications services shall provide such services to its subscribers in each State at rates no higher than the rates charged to its subscribers in any other State.

**(h) Telecommunications services for certain providers.**

**(1) In general.**

**(A) Health care providers for rural areas.** A telecommunications carrier shall, upon receiving a bona fide request, provide telecommunications services which are necessary for the provision of health care services in a State, including instruction relating to such services, to any public or nonprofit health care provider that serves persons who reside in rural areas in that State at rates that are reasonably comparable to rates charged for similar services in urban areas in that State. A telecommunications carrier providing service under this paragraph shall be entitled to have an amount equal to the difference, if any, between the rates for services provided to health care providers for rural areas in a State and the rates for similar services provided to other customers in comparable rural areas in that State treated as a service obligation as a part of its obligation to participate in the mechanisms to preserve and advance universal service.

**(B) Educational providers and libraries.** All telecommunications carriers serving a geographic area shall, upon a bona fide request for any of its services that are within the definition of universal service under subsection (c)(3), provide such services to elementary schools, secondary schools, and libraries for educational purposes at rates less than the amounts charged for similar services to other parties. The discount shall be an amount that the Commission, with respect to interstate services, and the States, with respect to intrastate services, determine is appropriate and necessary to ensure affordable access to and use of such services by such entities. A telecommunications carrier providing service under this paragraph shall—

**(i)** have an amount equal to the amount of the discount treated as an offset to its obligation to contribute to the mechanisms to preserve and advance universal service, or

**(ii)** notwithstanding the provisions of subsection (e) of this section, receive reimbursement utilizing the support mechanisms to preserve and advance universal service.

**(2) Advanced services.** The Commission shall establish competitively neutral rules—

**(A)** to enhance, to the extent technically feasible and economically reasonable, access to advanced telecommunications and information services for all public and nonprofit elementary and secondary school classrooms, health care providers, and libraries; and

**(B)** to define the circumstances under which a telecommunications carrier may be required to connect its network to such public institutional telecommunications users.

**(3)** Terms and conditions. Telecommunications services and network capacity provided to a public institutional telecommunications user under this subsection may not be sold, resold, or otherwise transferred by such user in consideration for money or any other thing of value.

**(4)** Eligibility of users. No entity listed in this subsection shall be entitled to preferential rates or treatment as required by this subsection, if such entity operates as a for-profit business, is a school described in paragraph (7)(A) with an endowment of more than \$50,000,000, or is a library or library consortium not eligible for assistance from a State library administrative agency under the Library Services and Technology Act [\[20 USCS §§ 9121 et seq.\]](#).

**(5)** Requirements for certain schools with computers having Internet access.

**(A)** Internet safety.

**(i)** In general. Except as provided in clause (ii), an elementary or secondary school having computers with Internet access may not receive services at discount rates under paragraph (1)(B) unless the school, school board, local educational agency, or other authority with responsibility for administration of the school—

**(I)** submits to the Commission the certifications described in subparagraphs (B) and (C);

**(II)** submits to the Commission a certification that an Internet safety policy has been adopted and implemented for the school under subsection (I); and

**(III)** ensures the use of such computers in accordance with the certifications.

**(ii)** Applicability. The prohibition in clause (i) shall not apply with respect to a school that receives services at discount rates under paragraph (1)(B) only for purposes other than the provision of Internet access, Internet service, or internal connections.

**(iii)** Public notice; hearing. An elementary or secondary school described in clause (i), or the school board, local educational agency, or other authority with responsibility for administration of the school, shall provide reasonable public notice and hold at least 1 public hearing or meeting to address the proposed Internet safety policy. In the case of an elementary or secondary school other than an elementary school or a secondary school as defined in section 8101 of the Elementary and Secondary Education Act of 1965 [\[20 USCS § 7801\]](#), the notice and hearing required by this clause may be limited to those members of the public with a relationship to the school.

**(B)** Certification with respect to minors. A certification under this subparagraph is a certification that the school, school board, local educational agency, or other authority with responsibility for administration of the school—

**(i)** is enforcing a policy of Internet safety for minors that includes monitoring the online activities of minors and the operation of a technology protection measure with respect to any of its computers with Internet access that protects against access through such computers to visual depictions that are—

**(I)** obscene;

**(II)** child pornography; or



**(III)** harmful to minors;

**(ii)** is enforcing the operation of such technology protection measure during any use of such computers by minors; and

**(iii)** as part of its Internet safety policy is educating minors about appropriate online behavior, including interacting with other individuals on social networking websites and in chat rooms and cyberbullying awareness and response.

**(C)** Certification with respect to adults. A certification under this paragraph is a certification that the school, school board, local educational agency, or other authority with responsibility for administration of the school—

**(i)** is enforcing a policy of Internet safety that includes the operation of a technology protection measure with respect to any of its computers with Internet access that protects against access through such computers to visual depictions that are—

**(I)** obscene; or

**(II)** child pornography; and

**(ii)** is enforcing the operation of such technology protection measure during any use of such computers.

**(D)** Disabling during adult use. An administrator, supervisor, or other person authorized by the certifying authority under subparagraph (A)(i) may disable the technology protection measure concerned, during use by an adult, to enable access for bona fide research or other lawful purpose.

**(E)** Timing of implementation.

**(i)** In general. Subject to clause (ii) in the case of any school covered by this paragraph as of the effective date of this paragraph under section 1721(h) of the Children's Internet Protection Act [note to this section], the certification under subparagraphs (B) and (C) shall be made—

**(I)** with respect to the first program funding year under this subsection following such effective date, not later than 120 days after the beginning of such program funding year; and

**(II)** with respect to any subsequent program funding year, as part of the application process for such program funding year.

**(ii)** Process.

**(I)** Schools with internet safety policy and technology protection measures in place. A school covered by clause (i) that has in place an Internet safety policy and technology protection measures meeting the requirements necessary for certification under subparagraphs (B) and (C) shall certify its compliance with subparagraphs (B) and (C) during each annual program application cycle under this subsection, except that with respect to the first program funding year after the effective date of this paragraph under section 1721(h) of the Children's Internet Protection Act [note to this section], the certifications shall be made not later than 120 days after the beginning of such first program funding year.

**(II)** Schools without internet safety policy and technology protection measures in place. A school covered by clause (i) that does not have in place an Internet



safety policy and technology protection measures meeting the requirements necessary for certification under subparagraphs (B) and (C)—

**(aa)** for the first program year after the effective date of this subsection in which it is applying for funds under this subsection, shall certify that it is undertaking such actions, including any necessary procurement procedures, to put in place an Internet safety policy and technology protection measures meeting the requirements necessary for certification under subparagraphs (B) and (C); and

**(bb)** for the second program year after the effective date of this subsection in which it is applying for funds under this subsection, shall certify that it is in compliance with subparagraphs (B) and (C).

Any school that is unable to certify compliance with such requirements in such second program year shall be ineligible for services at discount rates or funding in lieu of services at such rates under this subsection for such second year and all subsequent program years under this subsection, until such time as such school comes into compliance with this paragraph.

**(III) Waivers.** Any school subject to subclause (II) that cannot come into compliance with subparagraphs (B) and (C) in such second year program may seek a waiver of subclause (II)(bb) if State or local procurement rules or regulations or competitive bidding requirements prevent the making of the certification otherwise required by such subclause. A school, school board, local educational agency, or other authority with responsibility for administration of the school shall notify the Commission of the applicability of such subclause to the school. Such notice shall certify that the school in question will be brought into compliance before the start of the third program year after the effective date of this subsection in which the school is applying for funds under this subsection.

**(F) Noncompliance.**

**(i)** Failure to submit certification. Any school that knowingly fails to comply with the application guidelines regarding the annual submission of certification required by this paragraph shall not be eligible for services at discount rates or funding in lieu of services at such rates under this subsection.

**(ii)** Failure to comply with certification. Any school that knowingly fails to ensure the use of its computers in accordance with a certification under subparagraphs (B) and (C) shall reimburse any funds and discounts received under this subsection for the period covered by such certification.

**(iii) Remedy of noncompliance.**

**(I)** Failure to submit. A school that has failed to submit a certification under clause (i) may remedy the failure by submitting the certification to which the failure relates. Upon submittal of such certification, the school shall be eligible for services at discount rates under this subsection.

**(II)** Failure to comply. A school that has failed to comply with a certification as described in clause (ii) may remedy the failure by ensuring the use of its computers in accordance with such certification. Upon submittal to the Commission of a certification or other appropriate evidence of such remedy, the school shall be eligible for services at discount rates under this subsection.

**(6)** Requirements for certain libraries with computers having Internet access.

**(A)** Internet safety.

**(i)** In general. Except as provided in clause (ii), a library having one or more computers with Internet access may not receive services at discount rates under paragraph (1)(B) unless the library—

**(I)** submits to the Commission the certifications described in subparagraphs (B) and (C); and

**(II)** submits to the Commission a certification that an Internet safety policy has been adopted and implemented for the library under subsection (I); and

**(III)** ensures the use of such computers in accordance with the certifications.

**(ii)** Applicability. The prohibition in clause (i) shall not apply with respect to a library that receives services at discount rates under paragraph (1)(B) only for purposes other than the provision of Internet access, Internet service, or internal connections.

**(iii)** Public notice; hearing. A library described in clause (i) shall provide reasonable public notice and hold at least 1 public hearing or meeting to address the proposed Internet safety policy.

**(B)** Certification with respect to minors. A certification under this subparagraph is a certification that the library—

**(i)** is enforcing a policy of Internet safety that includes the operation of a technology protection measure with respect to any of its computers with Internet access that protects against access through such computers to visual depictions that are—

**(I)** obscene;

**(II)** child pornography; or

**(III)** harmful to minors; and

**(ii)** is enforcing the operation of such technology protection measure during any use of such computers by minors.

**(C)** Certification with respect to adults. A certification under this paragraph is a certification that the library—

**(i)** is enforcing a policy of Internet safety that includes the operation of a technology protection measure with respect to any of its computers with Internet access that protects against access through such computers to visual depictions that are—

**(I)** obscene; or

**(II)** child pornography; and

**(ii)** is enforcing the operation of such technology protection measure during any use of such computers.

**(D)** Disabling during adult use. An administrator, supervisor, or other person authorized by the certifying authority under subparagraph (A)(i) may disable the technology protection measure concerned, during use by an adult, to enable access for bona fide research or other lawful purpose.

**(E)** Timing of implementation.

(i) In general. Subject to clause (ii) in the case of any library covered by this paragraph as of the effective date of this paragraph under section 1721(h) of the Children's Internet Protection Act [note to this section], the certification under subparagraphs (B) and (C) shall be made—

(I) with respect to the first program funding year under this subsection following such effective date, not later than 120 days after the beginning of such program funding year; and

(II) with respect to any subsequent program funding year, as part of the application process for such program funding year.

(ii) Process.

(I) Libraries with internet safety policy and technology protection measures in place. A library covered by clause (i) that has in place an Internet safety policy and technology protection measures meeting the requirements necessary for certification under subparagraphs (B) and (C) shall certify its compliance with subparagraphs (B) and (C) during each annual program application cycle under this subsection, except that with respect to the first program funding year after the effective date of this paragraph under section 1721(h) of the Children's Internet Protection Act [note to this section], the certifications shall be made not later than 120 days after the beginning of such first program funding year.

(II) Libraries without internet safety policy and technology protection measures in place. A library covered by clause (i) that does not have in place an Internet safety policy and technology protection measures meeting the requirements necessary for certification under subparagraphs (B) and (C)—

(aa) for the first program year after the effective date of this subsection in which it is applying for funds under this subsection, shall certify that it is undertaking such actions, including any necessary procurement procedures, to put in place an Internet safety policy and technology protection measures meeting the requirements necessary for certification under subparagraphs (B) and (C); and

(bb) for the second program year after the effective date of this subsection in which it is applying for funds under this subsection, shall certify that it is in compliance with subparagraphs (B) and (C).

Any library that is unable to certify compliance with such requirements in such second program year shall be ineligible for services at discount rates or funding in lieu of services at such rates under this subsection for such second year and all subsequent program years under this subsection, until such time as such library comes into compliance with this paragraph.

(III) Waivers. Any library subject to subclause (II) that cannot come into compliance with subparagraphs (B) and (C) in such second year may seek a waiver of subclause (II)(bb) if State or local procurement rules or regulations or competitive bidding requirements prevent the making of the certification otherwise required by such subclause. A library, library board, or other authority with responsibility for administration of the library shall notify the Commission of the applicability of such subclause to the library. Such notice shall certify that the library in question will be brought into compliance before the start of the third

program year after the effective date of this subsection in which the library is applying for funds under this subsection.

**(F) Noncompliance.**

**(i)** Failure to submit certification. Any library that knowingly fails to comply with the application guidelines regarding the annual submission of certification required by this paragraph shall not be eligible for services at discount rates or funding in lieu of services at such rates under this subsection.

**(ii)** Failure to comply with certification. Any library that knowingly fails to ensure the use of its computers in accordance with a certification under subparagraphs (B) and (C) shall reimburse all funds and discounts received under this subsection for the period covered by such certification.

**(iii) Remedy of noncompliance.**

**(I)** Failure to submit. A library that has failed to submit a certification under clause (i) may remedy the failure by submitting the certification to which the failure relates. Upon submittal of such certification, the library shall be eligible for services at discount rates under this subsection.

**(II)** Failure to comply. A library that has failed to comply with a certification as described in clause (ii) may remedy the failure by ensuring the use of its computers in accordance with such certification. Upon submittal to the Commission of a certification or other appropriate evidence of such remedy, the library shall be eligible for services at discount rates under this subsection.

**(7) Definitions.** For purposes of this subsection:

**(A)** Elementary and secondary schools. The term “elementary and secondary schools” means elementary schools and secondary schools, as defined in section 8101 of the Elementary and Secondary Education Act of 1965 [[20 USCS § 7801](#)].

**(B)** Health care provider. The term “health care provider” means—

**(i)** post-secondary educational institutions offering health care instruction, teaching hospitals, and medical schools;

**(ii)** community health centers or health centers providing health care to migrants;

**(iii)** local health departments or agencies;

**(iv)** community mental health centers;

**(v)** not-for-profit hospitals;

**(vi)** rural health clinics;

**(vii)** skilled nursing facilities (as defined in section 1819(a) of the Social Security Act ([42 U.S.C. 1395i-3\(a\)](#))); and

**(viii)** consortia of health care providers consisting of one or more entities described in clauses (i) through (vii).

**(C)** Public institutional telecommunications user. The term “public institutional telecommunications user” means an elementary or secondary school, a library, or a health care provider as those terms are defined in this paragraph.

(D) Minor. The term “minor” means any individual who has not attained the age of 17 years.

(E) Obscene. The term “obscene” has the meaning given such term in [section 1460 of title 18, United States Code](#).

(F) Child pornography. The term “child pornography” has the meaning given such term in [section 2256 of title 18, United States Code](#).

(G) Harmful to minors. The term “harmful to minors” means any picture, image, graphic image file, or other visual depiction that—

(i) taken as a whole and with respect to minors, appeals to a prurient interest in nudity, sex, or excretion;

(ii) depicts, describes, or represents, in a patently offensive way with respect to what is suitable for minors, an actual or simulated sexual act or sexual contact, actual or simulated normal or perverted sexual acts, or a lewd exhibition of the genitals; and

(iii) taken as a whole, lacks serious literary, artistic, political, or scientific value as to minors.

(H) Sexual act; sexual contact. The terms “sexual act” and “sexual contact” have the meanings given such terms in [section 2246 of title 18, United States Code](#).

(I) Technology protection measure. The term “technology protection measure” means a specific technology that blocks or filters Internet access to the material covered by a certification under paragraph (5) or (6) to which such certification relates.

**(i) Consumer protection.** The Commission and the States should ensure that universal service is available at rates that are just, reasonable, and affordable.

**(j) Lifeline assistance.** Nothing in this section shall affect the collection, distribution, or administration of the Lifeline Assistance Program provided for by the Commission under regulations set forth in [section 69.117 of title 47, Code of Federal Regulations](#), and other related sections of such title.

**(k) Subsidy of competitive services prohibited.** A telecommunications carrier may not use services that are not competitive to subsidize services that are subject to competition. The Commission, with respect to interstate services, and the States, with respect to intrastate services, shall establish any necessary cost allocation rules, accounting safeguards, and guidelines to ensure that services included in the definition of universal service bear no more than a reasonable share of the joint and common costs of facilities used to provide those services.

**(l) Internet safety policy requirement for schools and libraries.**

(1) In general. In carrying out its responsibilities under subsection (h), each school or library to which subsection (h) applies shall—

(A) adopt and implement an Internet safety policy that addresses—

(i) access by minors to inappropriate matter on the Internet and World Wide Web;

(ii) the safety and security of minors when using electronic mail, chat rooms, and other forms of direct electronic communications;

(iii) unauthorized access, including so-called “hacking”, and other unlawful activities by minors online;

(iv) unauthorized disclosure, use, and dissemination of personal identification information regarding minors; and

(v) measures designed to restrict minors' access to materials harmful to minors; and

(B) provide reasonable public notice and hold at least one public hearing or meeting to address the proposed Internet safety policy.

(2) Local determination of content. A determination regarding what matter is inappropriate for minors shall be made by the school board, local educational agency, library, or other authority responsible for making the determination. No agency or instrumentality of the United States Government may—

(A) establish criteria for making such determination;

(B) review the determination made by the certifying school, school board, local educational agency, library, or other authority; or

(C) consider the criteria employed by the certifying school, school board, local educational agency, library, or other authority in the administration of subsection (h)(1)(B).

(3) Availability for review. Each Internet safety policy adopted under this subsection shall be made available to the Commission, upon request of the Commission, by the school, school board, local educational agency, library, or other authority responsible for adopting such Internet safety policy for purposes of the review of such Internet safety policy by the Commission.

(4) Effective date. This subsection shall apply with respect to schools and libraries on or after the date that is 120 days after the date of the enactment of the Children's Internet Protection Act [enacted Dec. 21, 2000].

## 47 U.S.C. §302a

**§ 302a. Devices which interfere with radio reception**

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**(a) Regulations.** The Commission may, consistent with the public interest, convenience, and necessity, make reasonable regulations (1) governing the interference potential of devices which in their operation are capable of emitting radio frequency energy by radiation, conduction, or other means in sufficient degree to cause harmful interference to radio communications; and (2) establishing minimum performance standards for home electronic equipment and systems to reduce their susceptibility to interference from radio frequency energy. Such regulations shall be applicable to the manufacture, import, sale, offer for sale, or shipment of such devices and home electronic equipment and systems, and to the use of such devices.

**(b) Restrictions.** No person shall manufacture, import, sell, offer for sale, or ship devices or home electronic equipment and systems, or use devices, which fail to comply with regulations promulgated pursuant to this section.

**(c) Exceptions.** The provisions of this section shall not be applicable to carriers transporting such devices or home electronic equipment and systems without trading in them, to devices or home electronic equipment and systems manufactured solely for export, to the manufacture, assembly, or installation of devices or home electronic equipment and systems for its own use by a public utility engaged in providing electric service, or to devices or home electronic equipment and systems for use by the Government of the United States or any agency thereof. Devices and home electronic equipment and systems for use by the Government of the United States or any agency thereof shall be developed, procured, or otherwise acquired, including offshore procurement, under United States Government criteria, standards, or specifications designed to achieve the objectives of reducing interference to radio reception and to home electronic equipment and systems, taking into account the unique needs of national defense and security.

**(d) Cellular telecommunications receivers.**

**(1)** Within 180 days after the date of enactment of this subsection [enacted Oct. 28, 1992], the Commission shall prescribe and make effective regulations denying equipment authorization (under part 15 of title 47, Code of Federal Regulations, or any other part of that title) for any scanning receiver that is capable of—

**(A)** receiving transmissions in the frequencies allocated to the domestic cellular radio telecommunications service,

**(B)** readily being altered by the user to receive transmissions in such frequencies, or

**(C)** being equipped with decoders that convert digital cellular transmissions to analog voice audio.

**(2)** Beginning 1 year after the effective date of the regulations adopted pursuant to paragraph (1), no receiver having the capabilities described in subparagraph (A), (B), or (C) of paragraph (1), as such capabilities are defined in such regulations, shall be manufactured in the United States or imported for use in the United States.

**(e) Delegation of equipment testing and certification to private laboratories.** The Commission may—



- (1) authorize the use of private organizations for testing and certifying the compliance of devices or home electronic equipment and systems with regulations promulgated under this section;
- (2) accept as prima facie evidence of such compliance the certification by any such organization; and
- (3) establish such qualifications and standards as it deems appropriate for such private organizations, testing, and certification.

**(f) State and local enforcement of FCC regulations on use of citizens band radio equipment.**

- (1) Except as provided in paragraph (2), a State or local government may enact a statute or ordinance that prohibits a violation of the following regulations of the Commission under this section:
  - (A) A regulation that prohibits a use of citizens band radio equipment not authorized by the Commission.
  - (B) A regulation that prohibits the unauthorized operation of citizens band radio equipment on a frequency between 24 MHz and 35 MHz.
- (2) A station that is licensed by the Commission pursuant to section 301 in any radio service for the operation at issue shall not be subject to action by a State or local government under this subsection. A State or local government statute or ordinance enacted for purposes of this subsection shall identify the exemption available under this paragraph.
- (3) The Commission shall, to the extent practicable, provide technical guidance to State and local governments regarding the detection and determination of violations of the regulations specified in paragraph (1).
- (4)
  - (A) In addition to any other remedy authorized by law, a person affected by the decision of a State or local government agency enforcing a statute or ordinance under paragraph (1) may submit to the Commission an appeal of the decision on the grounds that the State or local government, as the case may be, enacted a statute or ordinance outside the authority provided in this subsection.
  - (B) A person shall submit an appeal on a decision of a State or local government agency to the Commission under this paragraph, if at all, not later than 30 days after the date on which the decision by the State or local government agency becomes final, but prior to seeking judicial review of such decision.
  - (C) The Commission shall make a determination on an appeal submitted under subparagraph (B) not later than 180 days after its submittal.
  - (D) If the Commission determines under subparagraph (C) that a State or local government agency has acted outside its authority in enforcing a statute or ordinance, the Commission shall preempt the decision enforcing the statute or ordinance.
- (5) The enforcement of statute or ordinance that prohibits a violation of a regulation by a State or local government under paragraph (1) in a particular case shall not preclude the Commission from enforcing the regulation in that case concurrently.



**(6)** Nothing in this subsection shall be construed to diminish or otherwise affect the jurisdiction of the Commission under this section over devices capable of interfering with radio communications.

**(7)** The enforcement of a statute or ordinance by a State or local government under paragraph (1) with regard to citizens band radio equipment on board a “commercial motor vehicle”, as defined in [section 31101 of title 49, United States Code](#), shall require probable cause to find that the commercial motor vehicle or the individual operating the vehicle is in violation of the regulations described in paragraph (1).

## 47 U.S.C. §303

**§ 303. Powers and duties of Commission**

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Except as otherwise provided in this Act, the Commission from time to time, as public convenience, interest, or necessity requires, shall—

- (a) Classify radio stations;
- (b) Prescribe the nature of the service to be rendered by each class of licensed stations and each station within any class;
- (c) Assign bands of frequencies to the various classes of stations, and assign frequencies for each individual station and determine the power which each station shall use and the time during which it may operate;
- (d) Determine the location of classes of stations or individual stations;
- (e) Regulate the kind of apparatus to be used with respect to its external effects and the purity and sharpness of the emissions from each station and from the apparatus therein;
- (f) Make such regulations not inconsistent with law as it may deem necessary to prevent interference between stations and to carry out the provisions of this Act: *Provided, however,* That changes in the frequencies, authorized power, or in the times of operation of any station, shall not be made without the consent of the station licensee unless the Commission shall determine that such changes will promote public convenience or interest or will serve public necessity, or the provisions of this Act will be more fully complied with;
- (g) Study new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest;
- (h) Have authority to establish areas or zones to be served by any station;
- (i) Have authority to make special regulations applicable to radio stations engaged in chain broadcasting;
- (j) Have authority to make general rules and regulations requiring stations to keep such records of programs, transmissions of energy, communications, or signals as it may deem desirable;
- (k) Have authority to exclude from the requirements of any regulations in whole or in part any radio station upon railroad rolling stock, or to modify such regulations in its discretion;
- (l)
  - (1) Have authority to prescribe the qualifications of station operators, to classify them according to the duties to be performed, to fix the forms of such licenses, and to issue them to persons who are found to be qualified by the Commission and who otherwise are legally eligible for employment in the United States; except that such requirement relating to eligibility for employment in the United States shall not apply in the case of licenses issued by the Commission to (A) persons holding United States pilot certificates; or (B) persons holding foreign aircraft pilot certificates which are valid in the United States, if the foreign government involved has entered into a reciprocal agreement under which such foreign government does not impose any similar requirement relating to eligibility for employment upon citizens of the United States;

(2) Notwithstanding paragraph (1) of this subsection, an individual to whom a radio station is licensed under the provisions of this Act may be issued an operator's license to operate that station.

(3) In addition to amateur operator licenses which the Commission may issue to aliens pursuant to paragraph (2) of this subsection, and notwithstanding section 301 of this Act [[47 USCS § 301](#)] and paragraph (1) of this subsection, the Commission may issue authorizations, under such conditions and terms as it may prescribe, to permit an alien licensed by his government as an amateur radio operator to operate his amateur radio station licensed by his government in the United States, its possessions, and the Commonwealth of Puerto Rico provided there is in effect a multilateral or bilateral agreement, to which the United States and the alien's government are parties, for such operation on a reciprocal basis by United States amateur radio operators. Other provisions of this Act and of the Administrative Procedure Act [[5 USCS §§ 551](#) et seq., [701](#) et seq.] shall not be applicable to any request or application for or modification, suspension, or cancellation of any such authorization.

(m)

(1) Have authority to suspend the license of any operator upon proof sufficient to satisfy the Commission that the licensee—

(A) has violated, or caused, aided, or abetted the violation of, any provision of any Act, treaty, or convention binding on the United States, which the Commission is authorized to administer, or any regulation made by the Commission under any such Act, treaty, or convention; or

(B) has failed to carry out a lawful order of the master or person lawfully in charge of the ship or aircraft on which he is employed; or

(C) has willfully damaged or permitted radio apparatus or installations to be damaged; or

(D) has transmitted superfluous radio communications or signals or communications containing profane or obscene words, language, or meaning, or has knowingly transmitted—

(1) false or deceptive signals or communications, or

(2) a call signal or letter which has not been assigned by proper authority to the station he is operating; or

(E) has willfully or maliciously interfered with any other radio communications or signals; or

(F) has obtained or attempted to obtain, or has assisted another to obtain or attempt to obtain, an operator's license by fraudulent means.

(2) No order of suspension of any operator's license shall take effect until fifteen days' notice in writing thereof, stating the cause for the proposed suspension, has been given to the operator licensee who may make written application to the Commission at any time within said fifteen days for a hearing upon such order. The notice to the operator licensee shall not be effective until actually received by him, and from that time he shall have fifteen days in which to mail the said application. In the event that physical conditions prevent mailing of the application at the expiration of the fifteen-day period, the application shall then be mailed as soon as possible thereafter, accompanied by a satisfactory explanation of the delay. Upon receipt by the Commission of such application for hearing, said order of suspension shall be

held in abeyance until the conclusion of the hearing which shall be conducted under such rules as the Commission may prescribe. Upon the conclusion of said hearing the Commission may affirm, modify, or revoke said order of suspension.

(n) Have authority to inspect all radio installations associated with stations required to be licensed by any Act, or which the Commission by rule has authorized to operate without a license under section 307(e)(1) [[47 USCS § 307\(e\)\(1\)](#)]; or which are subject to the provisions of any Act, treaty, or convention binding on the United States, to ascertain whether in construction, installation, and operation they conform to the requirements of the rules and regulations of the Commission, the provisions of any Act, the terms of any treaty or convention binding on the United States, and the conditions of the license or other instrument of authorization under which they are constructed, installed, or operated.

(o) Have authority to designate call letters of all stations;

(p) Have authority to cause to be published such call letters and such other announcements and data as in the judgment of the Commission may be required for the efficient operation of radio stations subject to the jurisdiction of the United States and for the proper enforcement of this Act;

(q) Have authority to require the painting and/or illumination of radio towers if and when in its judgment such towers constitute, or there is a reasonable possibility that they may constitute, a menace to air navigation. The permittee or licensee, and the tower owner in any case in which the owner is not the permittee or licensee, shall maintain the painting and/or illumination of the tower as prescribed by the Commission pursuant to this section. In the event that the tower ceases to be licensed by the Commission for the transmission of radio energy, the owner of the tower shall maintain the prescribed painting and/or illumination of such tower until it is dismantled, and the Commission may require the owner to dismantle and remove the tower when the Administrator of the Federal Aviation Agency determines that there is a reasonable possibility that it may constitute a menace to air navigation.

(r) Make such rules and regulations and prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of this Act, or any international radio or wire communications treaty or convention, or regulations annexed thereto, including any treaty or convention insofar as it relates to the use of radio, to which the United States is or may hereafter become a party.

(s) Have authority to require that apparatus designed to receive television pictures broadcast simultaneously with sound be capable of adequately receiving all frequencies allocated by the Commission to television broadcasting when such apparatus is shipped in interstate commerce, or is imported from any foreign country into the United States, for sale or resale to the public.

(t) Notwithstanding the provisions of section 301(e) [[47 USCS § 301\(e\)](#)], have authority, in any case in which an aircraft registered in the United States is operated (pursuant to a lease, charter, or similar arrangement) by an aircraft operator who is subject to regulation by the government of a foreign nation, to enter into an agreement with such government under which the Commission shall recognize and accept any radio station licenses and radio operator licenses issued by such government with respect to such aircraft.

(u) Require that, if technically feasible—

(1) apparatus designed to receive or play back video programming transmitted simultaneously with sound, if such apparatus is manufactured in the United States or imported for use in the United States and uses a picture screen of any size—

(A) be equipped with built-in closed caption decoder circuitry or capability designed to display closed-captioned video programming;

(B) have the capability to decode and make available the transmission and delivery of video description services as required by regulations reinstated and modified pursuant to section 713(f) [[47 USCS § 613\(f\)](#)]; and

(C) have the capability to decode and make available emergency information (as that term is defined in section 79.2 of the Commission's regulations ([47 CFR 79.2](#))) in a manner that is accessible to individuals who are blind or visually impaired; and

(2) notwithstanding paragraph (1) of this subsection—

(A) apparatus described in such paragraph that use a picture screen that is less than 13 inches in size meet the requirements of subparagraph (A), (B), or (C) of such paragraph only if the requirements of such subparagraphs are achievable (as defined in section 716 [[47 USCS § 617](#)]);

(B) any apparatus or class of apparatus that are display-only video monitors with no playback capability are exempt from the requirements of such paragraph; and

(C) the Commission shall have the authority, on its own motion or in response to a petition by a manufacturer, to waive the requirements of this subsection for any apparatus or class of apparatus—

(i) primarily designed for activities other than receiving or playing back video programming transmitted simultaneously with sound; or

(ii) for equipment designed for multiple purposes, capable of receiving or playing video programming transmitted simultaneously with sound but whose essential utility is derived from other purposes.

(v) Have exclusive jurisdiction to regulate the provision of direct-to-home satellite services. As used in this subsection, the term “direct-to-home satellite services” means the distribution or broadcasting of programming or services by satellite directly to the subscriber's premises without the use of ground receiving or distribution equipment, except at the subscriber's premises or in the uplink process to the satellite.

(w) [Omitted]

(x) Require, in the case of an apparatus designed to receive television signals that are shipped in interstate commerce or manufactured in the United States and that have a picture screen 13 inches or greater in size (measured diagonally), that such apparatus be equipped with a feature designed to enable viewers to block display of all programs with a common rating, except as otherwise permitted by regulations pursuant to section 330(c)(4) [[47 USCS § 330\(c\)\(4\)](#)].

(y) Have authority to allocate electromagnetic spectrum so as to provide flexibility of use, if—

(1) such use is consistent with international agreements to which the United States is a party; and

(2) the Commission finds, after notice and an opportunity for public comment, that—

(A) such an allocation would be in the public interest;

(B) such use would not deter investment in communications services and systems, or technology development; and

(C) such use would not result in harmful interference among users.

**(z)** Require that—

(1) if achievable (as defined in section 716 [[47 USCS § 617](#)]), apparatus designed to record video programming transmitted simultaneously with sound, if such apparatus is manufactured in the United States or imported for use in the United States, enable the rendering or the pass through of closed captions, video description signals, and emergency information (as that term is defined in [section 79.2 of title 47, Code of Federal Regulations](#)) such that viewers are able to activate and de-activate the closed captions and video description as the video programming is played back on a picture screen of any size; and

(2) interconnection mechanisms and standards for digital video source devices are available to carry from the source device to the consumer equipment the information necessary to permit or render the display of closed captions and to make encoded video description and emergency information audible.

**(aa)** Require—

(1) if achievable (as defined in section 716 [[47 USCS § 617](#)]) that digital apparatus designed to receive or play back video programming transmitted in digital format simultaneously with sound, including apparatus designed to receive or display video programming transmitted in digital format using Internet protocol, be designed, developed, and fabricated so that control of appropriate built-in apparatus functions are accessible to and usable by individuals who are blind or visually impaired, except that the Commission may not specify the technical standards, protocols, procedures, and other technical requirements for meeting this requirement;

(2) that if on-screen text menus or other visual indicators built in to the digital apparatus are used to access the functions of the apparatus described in paragraph (1), such functions shall be accompanied by audio output that is either integrated or peripheral to the apparatus, so that such menus or indicators are accessible to and usable by individuals who are blind or visually impaired in real-time;

(3) that for such apparatus equipped with the functions described in paragraphs (1) and (2) built in access to those closed captioning and video description features through a mechanism that is reasonably comparable to a button, key, or icon designated for activating the closed captioning or accessibility features; and

(4) that in applying this subsection the term “apparatus” does not include a navigation device, as such term is defined in section 76.1200 of the Commission’s rules ([47 CFR 76.1200](#)).

**(bb)** Require—

(1) if achievable (as defined in section 716 [[47 USCS § 617](#)]), that the on-screen text menus and guides provided by navigation devices (as such term is defined in [section 76.1200 of title 47, Code of Federal Regulations](#)) for the display or selection of multichannel video programming are audibly accessible in real-time upon request by individuals who are blind or visually impaired, except that the Commission may not specify the technical standards, protocols, procedures, and other technical requirements for meeting this requirement;

(2) for navigation devices with built-in closed captioning capability, that access to that capability through a mechanism is reasonably comparable to a button, key, or icon designated for activating the closed captioning, or accessibility features; and

(3) that, with respect to navigation device features and functions—

**(A)** delivered in software, the requirements set forth in this subsection shall apply to the manufacturer of such software; and

**(B)** delivered in hardware, the requirements set forth in this subsection shall apply to the manufacturer of such hardware.

## 47 U.S.C. §305

**§ 305. Government owned stations**

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**(a) Frequencies; compliance with regulations; stations on vessels.** Radio stations belonging to and operated by the United States shall not be subject to the provisions of sections 301 and 303 of this Act [[47 USCS §§ 301](#) and [303](#)]. All such Government stations shall use such frequencies as shall be assigned to each or to each class by the President. All such stations, except stations on board naval and other Government vessels while at sea or beyond the limits of the continental United States, when transmitting any radio communication or signal other than a communication or signal relating to Government business, shall conform to such rules and regulations designed to prevent interference with other radio stations and the rights of others as the Commission may prescribe.

**(b) Call letters.** All stations owned and operated by the United States, except mobile stations of the Army of the United States, and all other stations on land and sea, shall have special call letters designated by the Commission.

**(c) Stations operated by foreign governments.** The provisions of sections 301 and 303 of this Act [[47 USCS §§ 301](#) and [303](#)] notwithstanding, the President may, provided he determines it to be consistent with and in the interest of national security, authorize a foreign government, under such terms and conditions as he may prescribe, to construct and operate at the seat of government of the United States a low-power radio station in the fixed service at or near the site of the embassy or legation of such foreign government for transmission of its messages to points outside the United States, but only (1) where he determines that the authorization would be consistent with the national interest of the United States and (2) where such foreign government has provided reciprocal privileges to the United States to construct and operate radio stations within territories subject to its jurisdiction. Foreign government stations authorized pursuant to the provisions of this subsection shall conform to such rules and regulations as the President may prescribe. The authorization of such stations, and the renewal, modification, suspension, revocation, or other termination of such authority shall be in accordance with such procedures as may be established by the President and shall not be subject to the other provisions of this Act or of the Administrative Procedure Act [[5 USCS §§ 551](#) et seq. and [§§ 701](#) et seq.].



## 47 U.S.C. §306

**§ 306. Foreign ships; application of section 301**

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Section 301 of this Act [[47 USCS § 301](#)] shall not apply to any person sending radio communications or signals on a foreign ship while the same is within the jurisdiction of the United States, but such communications or signals shall be transmitted only in accordance with such regulations designed to prevent interference as may be promulgated under the authority of this Act.

## 47 U.S.C. §307

**§ 307. Licenses**

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**(a) Grant.** The Commission, if public convenience, interest, or necessity will be served thereby, subject to the limitations of this Act [[47 USCS §§ 151](#) et seq.], shall grant to any applicant therefor, a station license provided for by this Act [[47 USCS §§ 151](#) et seq.].

**(b) Allocation of facilities.** In considering applications for licenses, and modifications and renewals thereof, when and insofar as there is demand for the same, the Commission shall make such distribution of licenses, frequencies, hours of operation, and of power among the several States and communities as to provide a fair, efficient, and equitable distribution of radio service to each of the same.

**(c) Terms of licenses.**

**(1)** Initial and renewal licenses. Each license granted for the operation of a broadcasting station shall be for a term of not to exceed 8 years. Upon application therefor, a renewal of such license may be granted from time to time for a term of not to exceed 8 years from the date of expiration of the preceding license, if the Commission finds that public interest, convenience, and necessity would be served thereby. Consistent with the foregoing provisions of this subsection, the Commission may by rule prescribe the period or periods for which licenses shall be granted and renewed for particular classes of stations, but the Commission may not adopt or follow any rule which would preclude it, in any case involving a station of a particular class, from granting or renewing a license for a shorter period than that prescribed for stations of such class if, in its judgment, the public interest, convenience, or necessity would be served by such action.

**(2)** Materials in application. In order to expedite action on applications for renewal of broadcasting station licenses and in order to avoid needless expense to applicants for such renewals, the Commission shall not require any such applicant to file any information which previously has been furnished to the Commission or which is not directly material to the considerations that affect the granting or denial of such application, but the Commission may require any new or additional facts it deems necessary to make its findings.

**(3)** Continuation pending decision. Pending any administrative or judicial hearing and final decision on such an application and the disposition of any petition for rehearing pursuant to section 405 or section 402 [[47 USCS § 405](#) or [402](#)], the Commission shall continue such license in effect.

**(d) Renewals.** No renewal of an existing station license in the broadcast or the common carrier services shall be granted more than thirty days prior to the expiration of the original license.

**(e) Operation of certain radio stations without individual licenses.**

**(1)** Notwithstanding any license requirement established in this Act, if the Commission determines that such authorization serves the public interest, convenience, and necessity, the Commission may by rule authorize the operation of radio stations without individual licenses in the following radio services: (A) the citizens band radio service; (B) the radio control service; (C) the aviation radio service for aircraft stations operated on domestic flights when such aircraft are not otherwise required to carry a radio station; and (D) the maritime radio service for ship stations navigated on domestic voyages when such ships are not otherwise required to carry a radio station.

(2) Any radio station operator who is authorized by the Commission to operate without an individual license shall comply with all other provisions of this Act and with rules prescribed by the Commission under this Act.

(3) For purposes of this subsection, the terms “citizens band radio service”, “radio control service”, “aircraft station” and “ship station” shall have the meanings given them by the Commission by rule.

**(f) Areas in Alaska without access to over the air broadcasts.** Notwithstanding any other provision of law, (1) any holder of a broadcast license may broadcast to an area of Alaska that otherwise does not have access to over the air broadcasts via translator, microwave, or other alternative signal delivery even if another holder of a broadcast license begins broadcasting to such area, (2) any holder of a broadcast license who has broadcast to an area of Alaska that did not have access to over the air broadcasts via translator, microwave, or other alternative signal delivery may continue providing such service even if another holder of a broadcast license begins broadcasting to such area, and shall not be fined or subject to any other penalty, forfeiture, or revocation related to providing such service including any fine, penalty, forfeiture, or revocation for continuing to operate notwithstanding orders to the contrary.

## 47 U.S.C. §321

**§ 321. Distress signals and communications; equipment on vessels; regulations**

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(a) The transmitting set in a radio station on shipboard may be adjusted in such a manner as to produce a maximum of radiation, irrespective of the amount of interference which may thus be caused, when such station is sending radio communications or signals of distress and radio communications relating thereto.

(b) All radio stations, including Government stations and stations on board foreign vessels when within the territorial waters of the United States, shall give absolute priority to radio communications or signals relating to ships in distress; shall cease all sending on frequencies which will interfere with hearing a radio communication or signal of distress, and, except when engaged in answering or aiding the ship in distress, shall refrain from sending any radio communications or signals until there is assurance that no interference will be caused with the radio communications or signals relating thereto, and shall assist the vessel in distress, so far as possible, by complying with its instructions.

## 47 U.S.C. §324

**§ 324. Use of minimum power**

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In all circumstances, except in case of radio communications or signals relating to vessels in distress, all radio stations, including those owned and operated by the United States, shall use the minimum amount of power necessary to carry out the communication desired.

## 47 U.S.C. §332

**§ 332. Mobile services**

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**(a) Factors which Commission must consider.** In taking actions to manage the spectrum to be made available for use by the private mobile services, the Commission shall consider, consistent with section 1 of this Act [[47 USCS § 151](#)], whether such actions will—

- (1) promote the safety of life and property;
- (2) improve the efficiency of spectrum use and reduce the regulatory burden upon spectrum users, based upon sound engineering principles, user operational requirements, and market-place demands;
- (3) encourage competition and provide services to the largest feasible number of users; or
- (4) increase interservice sharing opportunities between private mobile services and other services.

**(b) Advisory coordinating committees.**

- (1) The Commission, in coordinating the assignment of frequencies to stations in the private mobile services and in the fixed services (as defined by the Commission by rule), shall have authority to utilize assistance furnished by advisory coordinating committees consisting of individuals who are not officers or employees of the Federal Government.
- (2) The authority of the Commission established in this subsection shall not be subject to or affected by the provisions of part III of title 5, United States Code [[5 USCS §§ 2101](#) et seq.], or section 3679(b) of the Revised Statutes (31 U.S.C. 665(b)) [[31 USCS § 1342](#)].
- (3) Any person who provides assistance to the Commission under this subsection shall not be considered, by reason of having provided such assistance, a Federal employee.
- (4) Any advisory coordinating committee which furnishes assistance to the Commission under this subsection shall not be subject to the provisions of the Federal Advisory Committee Act [[5 USCS Appx](#)].

**(c) Regulatory treatment of mobile services.**

- (1) Common carrier treatment of commercial mobile services.
  - (A) A person engaged in the provision of a service that is a commercial mobile service shall, insofar as such person is so engaged, be treated as a common carrier for purposes of this Act [[47 USCS §§ 151](#) et seq.], except for such provisions of title II [[47 USCS §§ 201](#) et seq.] as the Commission may specify by regulation as inapplicable to that service or person. In prescribing or amending any such regulation, the Commission may not specify any provision of section 201, 202, or 208 [[47 USCS § 201](#), [202](#), or [208](#)], and may specify any other provision only if the Commission determines that—
    - (i) enforcement of such provision is not necessary in order to ensure that the charges, practices, classifications, or regulations for or in connection with that service are just and reasonable and are not unjustly or unreasonably discriminatory;
    - (ii) enforcement of such provision is not necessary for the protection of consumers; and
    - (iii) specifying such provision is consistent with the public interest.

**(B)** Upon reasonable request of any person providing commercial mobile service, the Commission shall order a common carrier to establish physical connections with such service pursuant to the provisions of section 201 of this Act [[47 USCS § 201](#)]. Except to the extent that the Commission is required to respond to such a request, this subparagraph shall not be construed as a limitation or expansion of the Commission's authority to order interconnection pursuant to this Act.

**(C)** As a part of making a determination with respect to the public interest under subparagraph (A)(iii), the Commission shall consider whether the proposed regulation (or amendment thereof) will promote competitive market conditions, including the extent to which such regulation (or amendment) will enhance competition among providers of commercial mobile services. If the Commission determines that such regulation (or amendment) will promote competition among providers of commercial mobile services, such determination may be the basis for a Commission finding that such regulation (or amendment) is in the public interest.

**(D)** The Commission shall, not later than 180 days after the date of enactment of this subparagraph [enacted Aug. 10, 1993], complete a rulemaking required to implement this paragraph with respect to the licensing of personal communications services, including making any determinations required by subparagraph (C).

**(2)** Non-common carrier treatment of private mobile services. A person engaged in the provision of a service that is a private mobile service shall not, insofar as such person is so engaged, be treated as a common carrier for any purpose under this Act. A common carrier (other than a person that was treated as a provider of a private land mobile service prior to the enactment of the Omnibus Budget Reconciliation Act of 1993 [enacted Aug. 10, 1993]) shall not provide any dispatch service on any frequency allocated for common carrier service, except to the extent such dispatch service is provided on stations licensed in the domestic public land mobile radio service before January 1, 1982. The Commission may by regulation terminate, in whole or in part, the prohibition contained in the preceding sentence if the Commission determines that such termination will serve the public interest.

**(3)** State preemption.

**(A)** Notwithstanding sections 2(b) and 221(b) [[47 USCS §§ 152\(b\)](#) and [221\(b\)](#)], no State or local government shall have any authority to regulate the entry of or the rates charged by any commercial mobile service or any private mobile service, except that this paragraph shall not prohibit a State from regulating the other terms and conditions of commercial mobile services. Nothing in this subparagraph shall exempt providers of commercial mobile services (where such services are a substitute for land line telephone exchange service for a substantial portion of the communications within such State) from requirements imposed by a State commission on all providers of telecommunications services necessary to ensure the universal availability of telecommunications service at affordable rates. Notwithstanding the first sentence of this subparagraph, a State may petition the Commission for authority to regulate the rates for any commercial mobile service and the Commission shall grant such petition if such State demonstrates that—

**(i)** market conditions with respect to such services fail to protect subscribers adequately from unjust and unreasonable rates or rates that are unjustly or unreasonably discriminatory; or

(ii) such market conditions exist and such service is a replacement for land line telephone exchange service for a substantial portion of the telephone land line exchange service within such State.

The Commission shall provide reasonable opportunity for public comment in response to such petition, and shall, within 9 months after the date of its submission, grant or deny such petition. If the Commission grants such petition, the Commission shall authorize the State to exercise under State law such authority over rates, for such periods of time, as the Commission deems necessary to ensure that such rates are just and reasonable and not unjustly or unreasonably discriminatory.

(B) If a State has in effect on June 1, 1993, any regulation concerning the rates for any commercial mobile service offered in such State on such date, such State may, no later than 1 year after the date of enactment of the Omnibus Budget Reconciliation Act of 1993 [enacted Aug. 10, 1993], petition the Commission requesting that the State be authorized to continue exercising authority over such rates. If a State files such a petition, the State's existing regulation shall, notwithstanding subparagraph (A), remain in effect until the Commission completes all action (including any reconsideration) on such petition. The Commission shall review such petition in accordance with the procedures established in such subparagraph, shall complete all action (including any reconsideration) within 12 months after such petition is filed, and shall grant such petition if the State satisfies the showing required under subparagraph (A)(i) or (A)(ii). If the Commission grants such petition, the Commission shall authorize the State to exercise under State law such authority over rates, for such period of time, as the Commission deems necessary to ensure that such rates are just and reasonable and not unjustly or unreasonably discriminatory. After a reasonable period of time, as determined by the Commission, has elapsed from the issuance of an order under subparagraph (A) or this subparagraph, any interested party may petition the Commission for an order that the exercise of authority by a State pursuant to such subparagraph is no longer necessary to ensure that the rates for commercial mobile services are just and reasonable and not unjustly or unreasonably discriminatory. The Commission shall provide reasonable opportunity for public comment in response to such petition, and shall, within 9 months after the date of its submission, grant or deny such petition in whole or in part.

(4) Regulatory treatment of communications satellite corporation. Nothing in this subsection shall be construed to alter or affect the regulatory treatment required by title IV of the Communications Satellite Act of 1962 [[47 USCS §§ 741](#) et seq.] of the corporation authorized by title III of such Act [[47 USCS §§ 731](#) et seq.].

(5) Space segment capacity. Nothing in this section shall prohibit the Commission from continuing to determine whether the provision of space segment capacity by satellite systems to providers of commercial mobile services shall be treated as common carriage.

(6) Foreign ownership. The Commission, upon a petition for waiver filed within 6 months after the date of enactment of the Omnibus Budget Reconciliation Act of 1993 [Aug. 10, 1993], may waive the application of section 310(b) [[47 USCS § 310\(b\)](#)] to any foreign ownership that lawfully existed before May 24, 1993, of any provider of a private land mobile service that will be treated as a common carrier as a result of the enactment of the Omnibus Budget Reconciliation Act of 1993, but only upon the following conditions:

(A) The extent of foreign ownership interest shall not be increased above the extent which existed on May 24, 1993.



(B) Such waiver shall not permit the subsequent transfer of ownership to any other person in violation of section 310(b) [[47 USCS § 310\(b\)](#)].

(7) Preservation of local zoning authority.

(A) General authority. Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.

(B) Limitations.

(i) The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof—

(I) shall not unreasonably discriminate among providers of functionally equivalent services; and

(II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.

(ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.

(iii) Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

(iv) No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.

(v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

(C) Definitions. For purposes of this paragraph—

(i) the term “personal wireless services” means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;

(ii) the term “personal wireless service facilities” means facilities for the provision of personal wireless services; and

(iii) the term “unlicensed wireless service” means the offering of telecommunications services using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services (as defined in section 303(v) [[47 USCS § 303\(v\)](#)]).

(8) Mobile services access. A person engaged in the provision of commercial mobile services, insofar as such person is so engaged, shall not be required to provide equal access to common carriers for the provision of telephone toll services. If the Commission determines that subscribers to such services are denied access to the provider of telephone toll services of the subscribers' choice, and that such denial is contrary to the public interest, convenience, and necessity, then the Commission shall prescribe regulations to afford subscribers unblocked access to the provider of telephone toll services of the subscribers' choice through the use of a carrier identification code assigned to such provider or other mechanism. The requirements for unblocking shall not apply to mobile satellite services unless the Commission finds it to be in the public interest to apply such requirements to such services.

**(d) Definitions.** For purposes of this section—

(1) the term “commercial mobile service” means any mobile service (as defined in section 3 [47 USCS § 153]) that is provided for profit and makes interconnected service available (A) to the public or (B) to such classes of eligible users as to be effectively available to a substantial portion of the public, as specified by regulation by the Commission;

(2) the term “interconnected service” means service that is interconnected with the public switched network (as such terms are defined by regulation by the Commission) or service for which a request for interconnection is pending pursuant to subsection (c)(1)(B); and

(3) the term “private mobile service” means any mobile service (as defined in section 3 [47 USCS § 153]) that is not a commercial mobile service or the functional equivalent of a commercial mobile service, as specified by regulation by the Commission.

## 47 U.S.C. §336

**§ 336. Broadcast spectrum flexibility**

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**(a) Commission action.** If the Commission determines to issue additional licenses for advanced television services, the Commission—

- (1) should limit the initial eligibility for such licenses to persons that, as of the date of such issuance, are licensed to operate a television broadcast station or hold a permit to construct such a station (or both); and
- (2) shall adopt regulations that allow the holders of such licenses to offer such ancillary or supplementary services on designated frequencies as may be consistent with the public interest, convenience, and necessity.

**(b) Contents of regulations.** In prescribing the regulations required by subsection (a), the Commission shall—

- (1) only permit such licensee or permittee to offer ancillary or supplementary services if the use of a designated frequency for such services is consistent with the technology or method designated by the Commission for the provision of advanced television services;
- (2) limit the broadcasting of ancillary or supplementary services on designated frequencies so as to avoid derogation of any advanced television services, including high definition television broadcasts, that the Commission may require using such frequencies;
- (3) apply to any other ancillary or supplementary service such of the Commission's regulations as are applicable to the offering of analogous services by any other person, except that no ancillary or supplementary service shall have any rights to carriage under section 614 or 615 [[47 USCS § 534](#) or [535](#)] or be deemed a multichannel video programming distributor for purposes of section 628 [[47 USCS § 548](#)];
- (4) adopt such technical and other requirements as may be necessary or appropriate to assure the quality of the signal used to provide advanced television services, and may adopt regulations that stipulate the minimum number of hours per day that such signal must be transmitted; and
- (5) prescribe such other regulations as may be necessary for the protection of the public interest, convenience, and necessity.

**(c) Recovery of license.** If the Commission grants a license for advanced television services to a person that, as of the date of such issuance, is licensed to operate a television broadcast station or holds a permit to construct such a station (or both), the Commission shall, as a condition of such license, require that either the additional license or the original license held by the licensee be surrendered to the Commission for reallocation or reassignment (or both) pursuant to Commission regulation.

**(d) Public interest requirement.** Nothing in this section shall be construed as relieving a television broadcasting station from its obligation to serve the public interest, convenience, and necessity. In the Commission's review of any application for renewal of a broadcast license for a television station that provides ancillary or supplementary services, the television licensee shall establish that all of its program services on the existing or advanced television spectrum are in the public interest. Any violation of the Commission rules applicable to ancillary or supplementary services shall reflect upon the licensee's qualifications for renewal of its license.

**(e) Fees.**

**(1)** Services to which fees apply. If the regulations prescribed pursuant to subsection (a) permit a licensee to offer ancillary or supplementary services on a designated frequency—

**(A)** for which the payment of a subscription fee is required in order to receive such services, or

**(B)** for which the licensee directly or indirectly receives compensation from a third party in return for transmitting material furnished by such third party (other than commercial advertisements used to support broadcasting for which a subscription fee is not required),

the Commission shall establish a program to assess and collect from the licensee for such designated frequency an annual fee or other schedule or method of payment that promotes the objectives described in subparagraphs (A) and (B) of paragraph (2).

**(2)** Collection of fees. The program required by paragraph (1) shall—

**(A)** be designed (i) to recover for the public a portion of the value of the public spectrum resource made available for such commercial use, and (ii) to avoid unjust enrichment through the method employed to permit such uses of that resource;

**(B)** recover for the public an amount that, to the extent feasible, equals but does not exceed (over the term of the license) the amount that would have been recovered had such services been licensed pursuant to the provisions of section 309(j) of this Act [\[47 USCS § 309\(j\)\]](#) and the Commission's regulations thereunder; and

**(C)** be adjusted by the Commission from time to time in order to continue to comply with the requirements of this paragraph.

**(3)** Treatment of revenues.

**(A)** General rule. Except as provided in subparagraph (B), all proceeds obtained pursuant to the regulations required by this subsection shall be deposited in the Treasury in accordance with chapter 33 of title 31, United States Code [\[31 USCS §§ 3301 et seq.\]](#).

**(B)** Retention of revenues. Notwithstanding subparagraph (A), the salaries and expenses account of the Commission shall retain as an offsetting collection such sums as may be necessary from such proceeds for the costs of developing and implementing the program required by this section and regulating and supervising advanced television services. Such offsetting collections shall be available for obligation subject to the terms and conditions of the receiving appropriations account, and shall be deposited in such accounts on a quarterly basis.

**(4)** Report. The Commission shall annually advise the Congress on the amounts collected pursuant to the program required by this subsection.

**(f) Preservation of low-power community television broadcasting.**

**(1)** Creation of class A licenses.

**(A)** Rulemaking required. Within 120 days after the date of the enactment of the Community Broadcasters Protection Act of 1999 [enacted Nov. 29, 1999], the Commission shall prescribe regulations to establish a class A television license to be available to licensees of qualifying low-power television stations. Such regulations shall provide that—

(i) the license shall be subject to the same license terms and renewal standards as the licenses for full-power television stations except as provided in this subsection; and

(ii) each such class A licensee shall be accorded primary status as a television broadcaster as long as the station continues to meet the requirements for a qualifying low-power station in paragraph (2).

**(B)** Notice to and certification by licensees. Within 30 days after the date of the enactment of the Community Broadcasters Protection Act of 1999 [enacted Nov. 29, 1999], the Commission shall send a notice to the licensees of all low-power television licenses that describes the requirements for class A designation. Within 60 days after such date of enactment, licensees intending to seek class A designation shall submit to the Commission a certification of eligibility based on the qualification requirements of this subsection. Absent a material deficiency, the Commission shall grant certification of eligibility to apply for class A status.

**(C)** Application for and award of licenses. Consistent with the requirements set forth in paragraph (2)(A) of this subsection, a licensee may submit an application for class A designation under this paragraph within 30 days after final regulations are adopted under subparagraph (A) of this paragraph. Except as provided in paragraphs (6) and (7), the Commission shall, within 30 days after receipt of an application of a licensee of a qualifying low-power television station that is acceptable for filing, award such a class A television station license to such licensee.

**(D)** Resolution of technical problems. The Commission shall act to preserve the service areas of low-power television licensees pending the final resolution of a class A application. If, after granting certification of eligibility for a class A license, technical problems arise requiring an engineering solution to a full-power station's allotted parameters or channel assignment in the digital television Table of Allotments, the Commission shall make such modifications as necessary—

(i) to ensure replication of the full-power digital television applicant's service area, as provided for in sections 73.622 and 73.623 of the Commission's regulations ([47 CFR 73.622](#), [73.623](#)); and

(ii) to permit maximization of a full-power digital television applicant's service area consistent with such sections 73.622 and 73.623,

if such applicant has filed an application for maximization or a notice of its intent to seek such maximization by December 31, 1999, and filed a bona fide application for maximization by May 1, 2000. Any such applicant shall comply with all applicable Commission rules regarding the construction of digital television facilities.

**(E)** Change applications. If a station that is awarded a construction permit to maximize or significantly enhance its digital television service area, later files a change application to reduce its digital television service area, the protected contour of that station shall be reduced in accordance with such change modification.

**(2)** Qualifying low-power television stations. For purposes of this subsection, a station is a qualifying low-power television station if—

**(A)**

(i) during the 90 days preceding the date of the enactment of the Community Broadcasters Protection Act of 1999 [enacted Nov. 29, 1999]—

(I) such station broadcast a minimum of 18 hours per day;

(II) such station broadcast an average of at least 3 hours per week of programming that was produced within the market area served by such station, or the market area served by a group of commonly controlled low-power stations that carry common local programming produced within the market area served by such group; and

(III) such station was in compliance with the Commission's requirements applicable to low-power television stations; and

(ii) from and after the date of its application for a class A license, the station is in compliance with the Commission's operating rules for full-power television stations; or

(B) the Commission determines that the public interest, convenience, and necessity would be served by treating the station as a qualifying low-power television station for purposes of this section, or for other reasons determined by the Commission.

(3) Common ownership. No low-power television station authorized as of the date of the enactment of the Community Broadcasters Protection Act of 1999 [enacted Nov. 29, 1999] shall be disqualified for a class A license based on common ownership with any other medium of mass communication.

(4) Issuance of licenses for advanced television services to television translator stations and qualifying low-power television stations. The Commission is not required to issue any additional license for advanced television services to the licensee of a class A television station under this subsection, or to any licensee of any television translator station, but shall accept a license application for such services proposing facilities that will not cause interference to the service area of any other broadcast facility applied for, protected, permitted, or authorized on the date of filing of the advanced television application. Such new license or the original license of the applicant shall be forfeited after the end of the digital television service transition period, as determined by the Commission. A licensee of a low-power television station or television translator station may, at the option of licensee, elect to convert to the provision of advanced television services on its analog channel, but shall not be required to convert to digital operation until the end of such transition period.

(5) No preemption of section 337. Nothing in this subsection preempts or otherwise affects section 337 of this Act [[47 USCS § 337](#)].

(6) Interim qualification.

(A) Stations operating within certain bandwidth. The Commission may not grant a class A license to a low-power television station for operation between 698 and 806 megahertz, but the Commission shall provide to low-power television stations assigned to and temporarily operating in that bandwidth the opportunity to meet the qualification requirements for a class A license. If such a qualified applicant for a class A license is assigned a channel within the core spectrum (as such term is defined in MM Docket No. 87-286, February 17, 1998), the Commission shall issue a class A license simultaneously with the assignment of such channel.

**(B)** Certain channels off-limits. The Commission may not grant under this subsection a class A license to a low-power television station operating on a channel within the core spectrum that includes any of the 175 additional channels referenced in paragraph 45 of its February 23, 1998, Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order (MM Docket No. 87-268). Within 18 months after the date of the enactment of the Community Broadcasters Protection Act of 1999, the Commission shall identify by channel, location, and applicable technical parameters those 175 channels.

**(7)** No interference requirement. The Commission may not grant a class A license, nor approve a modification of a class A license, unless the applicant or licensee shows that the class A station for which the license or modification is sought will not cause—

**(A)** interference within—

**(i)** the predicted Grade B contour (as of the date of the enactment of the Community Broadcasters Protection Act of 1999 [enacted Nov. 29, 1999], or November 1, 1999, whichever is later, or as proposed in a change application filed on or before such date) of any television station transmitting in analog format; or

**(ii)** (I) the digital television service areas provided in the DTV Table of Allotments; (II) the areas protected in the Commission's digital television regulations ([47 CFR 73.622\(e\)](#) and (f)); (III) the digital television service areas of stations subsequently granted by the Commission prior to the filing of a class A application; and (IV) stations seeking to maximize power under the Commission's rules, if such station has complied with the notification requirements in paragraph (1)(D);

**(B)** interference within the protected contour of any low-power television station or low-power television translator station that—

**(i)** was licensed prior to the date on which the application for a class A license, or for the modification of such a license, was filed;

**(ii)** was authorized by construction permit prior to such date; or

**(iii)** had a pending application that was submitted prior to such date; or

**(C)** interference within the protected contour of 80 miles from the geographic center of the areas listed in section 22.625(b)(1) or 90.303 of the Commission's regulations ([47 CFR 22.625\(b\)\(1\)](#) and [90.303](#)) for frequencies in—

**(i)** the 470-512 megahertz band identified in section 22.621 or 90.303 of such regulations; or

**(ii)** the 482-488 megahertz band in New York.

**(8)** Priority for displaced low-power stations. Low-power stations that are displaced by an application filed under this section shall have priority over other low-power stations in the assignment of available channels.

**(g) Evaluation.** Within 10 years after the date the Commission first issues additional licenses for advanced television services, the Commission shall conduct an evaluation of the advanced television services program. Such evaluation shall include—

**(1)** an assessment of the willingness of consumers to purchase the television receivers necessary to receive broadcasts of advanced television services;



(2) an assessment of alternative uses, including public safety use, of the frequencies used for such broadcasts; and

(3) the extent to which the Commission has been or will be able to reduce the amount of spectrum assigned to licensees.

**(h) Provision of digital service by low-power television stations.**

(1) Within 60 days after receiving a request (made in such form and manner and containing such information as the Commission may require) under this subsection from a low-power television station to which this subsection applies, the Commission shall authorize the licensee or permittee of that station to provide digital data service subject to the requirements of this subsection as a pilot project to demonstrate the feasibility of using low-power television stations to provide high-speed wireless digital data service, including Internet access to unserved areas.

(2) The low-power television stations to which this subsection applies are as follows:

(A) KHLM LP, Houston, Texas.

(B) WTAM LP, Tampa, Florida.

(C) WWRJ LP, Jacksonville, Florida.

(D) WVBG LP, Albany, New York.

(E) KHHI LP, Honolulu, Hawaii.

(F) KPHE LP (K19DD), Phoenix, Arizona.

(G) K34FI, Bozeman, Montana.

(H) K65GZ, Bozeman, Montana.

(I) WXOB LP, Richmond, Virginia.

(J) WIIW LP, Nashville, Tennessee.

(K) A station and repeaters to be determined by the Federal Communications Commission for the sole purpose of providing service to communities in the Kenai Peninsula Borough and Matanuska Susitna Borough.

(L) WSPY LP, Plano, Illinois.

(M) W24AJ, Aurora, Illinois.

(3) Notwithstanding any requirement of [section 553 of title 5, United States Code](#), the Commission shall promulgate regulations establishing the procedures, consistent with the requirements of paragraphs (4) and (5), governing the pilot projects for the provision of digital data services by certain low power television licensees within 120 days after the date of enactment of LPTV Digital Data Services Act. The regulations shall set forth—

(A) requirements as to the form, manner, and information required for submitting requests to the Commission to provide digital data service as a pilot project;

(B) procedures for testing interference to digital television receivers caused by any pilot project station or remote transmitter;

(C) procedures for terminating any pilot project station or remote transmitter or both that causes interference to any analog or digital full-power television stations, class A television station, television translators or any other users of the core television band;



**(D)** specifications for reports to be filed quarterly by each low power television licensee participating in a pilot project;

**(E)** procedures by which a low power television licensee participating in a pilot project shall notify television broadcast stations in the same market upon commencement of digital data services and for ongoing coordination with local broadcasters during the test period; and

**(F)** procedures for the receipt and review of interference complaints on an expedited basis consistent with paragraph (5)(D).

**(4)** A low-power television station to which this subsection applies may not provide digital data service unless—

**(A)** the provision of that service, including any remote return-path transmission in the case of 2-way digital data service, does not cause any interference in violation of the Commission's existing rules, regarding interference caused by low power television stations to full-service analog or digital television stations, class A television stations, or television translator stations; and

**(B)** the station complies with the Commission's regulations governing safety, environmental, and sound engineering practices, and any other Commission regulation under paragraph (3) governing pilot program operations.

**(5)**

**(A)** The Commission may limit the provision of digital data service by a low-power television station to which this subsection applies if the Commission finds that—

**(i)** the provision of 2-way digital data service by that station causes any interference that cannot otherwise be remedied; or

**(ii)** the provision of 1-way digital data service by that station causes any interference.

**(B)** The Commission shall grant any such station, upon application (made in such form and manner and containing such information as the Commission may require) by the licensee or permittee of that station, authority to move the station to another location, to modify its facilities to operate on a different channel, or to use booster or auxiliary transmitting locations, if the grant of authority will not cause interference to the allowable or protected service areas of full service digital television stations, National Television Standards Committee assignments, or television translator stations, and provided, however, no such authority shall be granted unless it is consistent with existing Commission regulations relating to the movement, modification, and use of non-class A low power television transmission facilities in order—

**(i)** to operate within television channels 2 through 51, inclusive; or

**(ii)** to demonstrate the utility of low-power television stations to provide high-speed 2-way wireless digital data service.

**(C)** The Commission shall require quarterly reports from each station authorized to provide digital data services under this subsection that include—

**(i)** information on the station's experience with interference complaints and the resolution thereof;

**(ii)** information on the station's market success in providing digital data service; and

(iii) such other information as the Commission may require in order to administer this subsection.

(D) The Commission shall resolve any complaints of interference with television reception caused by any station providing digital data service authorized under this subsection within 60 days after the complaint is received by the Commission.

(6) The Commission shall assess and collect from any low-power television station authorized to provide digital data service under this subsection an annual fee or other schedule or method of payment comparable to any fee imposed under the authority of this Act on providers of similar services. Amounts received by the Commission under this paragraph may be retained by the Commission as an offsetting collection to the extent necessary to cover the costs of developing and implementing the pilot program authorized by this subsection, and regulating and supervising the provision of digital data service by low-power television stations under this subsection. Amounts received by the Commission under this paragraph in excess of any amount retained under the preceding sentence shall be deposited in the Treasury in accordance with chapter 33 of title 31, United States Code.

(7) In this subsection, the term “digital data service” includes—

(A) digitally-based interactive broadcast service; and

(B) wireless Internet access, without regard to—

(i) whether such access is—

(I) provided on a one-way or a two-way basis;

(II) portable or fixed; or

(III) connected to the Internet via a band allocated to Interactive Video and Data Service; and

(ii) the technology employed in delivering such service, including the delivery of such service via multiple transmitters at multiple locations.

(8) Nothing in this subsection limits the authority of the Commission under any other provision of law.

(i) **Definitions.** As used in this section:

(1) Advanced television services. The term “advanced television services” means television services provided using digital or other advanced technology as further defined in the opinion, report, and order of the Commission entitled “Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service”, MM Docket 87-268, adopted September 17, 1992, and successor proceedings.

(2) Designated frequencies. The term “designated frequency” means each of the frequencies designated by the Commission for licenses for advanced television services.

(3) High definition television. The term “high definition television” refers to systems that offer approximately twice the vertical and horizontal resolution of receivers generally available on the date of enactment of the Telecommunications Act of 1996 [enacted Feb. 8, 1996], as further defined in the proceedings described in paragraph (1) of this subsection.

## 47 U.S.C. §414

**§ 414. Exclusiveness of Act**

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Nothing in this Act contained shall in any way abridge or alter the remedies now existing at common law or by statute, but the provisions of this Act are in addition to such remedies.

## 47 U.S.C. §601

**§ 601. Interstate Commerce Commission and Postmaster General; duties, powers, and functions transferred to Commission**

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(a) All duties, powers, and functions of the Interstate Commerce Commission under the Act of August 7, 1888 (25 Stat. 382) [[47 USCS §§ 9–15](#)] relating to operation of telegraph lines by railroad and telegraph companies granted Government aid in the construction of the lines, are hereby imposed upon and vested in the Commission: *Provided*, That such transfer of duties, powers, and functions shall not be construed to affect the duties, powers, functions, or jurisdiction of the Interstate Commerce Commission under, or to interfere with or prevent the enforcement of, the Interstate Commerce Act and all Acts amendatory thereof or supplemental thereto [[49 USCS §§ 10101](#) et seq.].

(b) All duties, powers, and functions of the Postmaster General [United States Postal Service] with respect to telegraph companies and telegraph lines under any existing provision of law are hereby imposed upon and vested in the Commission.

## 47 U.S.C. §925

**§ 925. Distribution of frequencies by Commission**

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**(a) Allocation and assignment of immediately available frequencies.** With respect to the frequencies made available for immediate reallocation pursuant to section 113(e)(2) [[47 USCS § 923\(e\)\(2\)](#)], the Commission, not later than 18 months after the date of enactment of the Omnibus Budget Reconciliation Act of 1993 [enacted Aug. 10, 1993], shall issue regulations to allocate such frequencies and shall propose regulations to assign such frequencies.

**(b) Allocation and assignment of remaining available frequencies.** With respect to the frequencies made available for reallocation pursuant to section 113(e)(3) [[47 USCS § 923\(e\)\(3\)](#)], the Commission shall, not later than 1 year after receipt of the initial reallocation report required by section 113(a) [[47 USCS § 923\(a\)](#)], prepare, submit to the President and the Congress, and implement, a plan for the allocation and assignment under the 1934 Act of such frequencies. Such plan shall—

(1) not propose the immediate allocation and assignment of all such frequencies but, taking into account the timetable recommended by the Secretary pursuant to section 113(e) [[47 USCS § 923\(e\)](#)], shall propose—

(A) gradually to allocate and assign the frequencies remaining, after making the reservation required by subparagraph (B), over the course of 10 years beginning on the date of submission of such plan; and

(B) to reserve a significant portion of such frequencies for allocation and assignment beginning after the end of such 10-year period;

(2) contain appropriate provisions to ensure—

(A) the availability of frequencies for new technologies and services in accordance with the policies of section 7 of the 1934 Act ([47 U.S.C. 157](#));

(B) the availability of frequencies to stimulate the development of such technologies; and

(C) the safety of life and property in accordance with the policies of section 1 of the 1934 Act ([47 U.S.C. 151](#));

(3) address (A) the feasibility of reallocating portions of the spectrum from current commercial and other non-Federal uses to provide for more efficient use of the spectrum, and (B) innovation and marketplace developments that may affect the relative efficiencies of different spectrum allocations;

(4) not prevent the Commission from allocating frequencies, and assigning licenses to use frequencies, not included in the plan; and

(5) not preclude the Commission from making changes to the plan in future proceedings.

**(c) Allocation and assignment of frequencies identified in the second reallocation report.**

(1) Plan and implementation. With respect to the frequencies made available for reallocation pursuant to section 113(b)(3) [[47 USCS § 923\(b\)\(3\)](#)], the Commission shall, not later than one year after receipt of the second reallocation report required by section 113(a) [[47 USCS § 923\(a\)](#)], prepare, submit to the President and the Congress, and implement, a plan for the immediate allocation and assignment under the 1934 Act of all such frequencies in accordance with section 309(j) of such Act [[47 USCS § 309\(j\)](#)].

**(2)** Contents. The plan prepared by the Commission under paragraph (1) shall consist of a schedule of allocation and assignment of those frequencies in accordance with section 309(j) of the 1934 Act [[47 USCS § 309\(j\)](#)] in time for the assignment of those licenses or permits by September 30, 2002.

## 47 U.S.C. §1455

**§ 1455. Wireless facilities deployment**

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**(a) Facility modifications.**

(1) In general. Notwithstanding section 704 of the Telecommunications Act of 1996 (*Public Law 104-104*) or any other provision of law, a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.

(2) Eligible facilities request. For purposes of this subsection, the term “eligible facilities request” means any request for modification of an existing wireless tower or base station that involves—

- (A) collocation of new transmission equipment;
- (B) removal of transmission equipment; or
- (C) replacement of transmission equipment.

(3) Applicability of environmental laws. Nothing in paragraph (1) shall be construed to relieve the Commission from the requirements of the National Historic Preservation Act [[16 USCS §§ 470](#) et seq.] or the National Environmental Policy Act of 1969 [[42 USCS §§ 4321](#) et seq.].

**(b) Federal easements, rights-of-way, and leases.**

(1) Grant. If an executive agency, a State, a political subdivision or agency of a State, or a person, firm, or organization applies for the grant of an easement, right-of-way, or lease to, in, over, or on a building or other property owned by the Federal Government for the right to install, construct, modify, or maintain a communications facility installation, the executive agency having control of the building or other property may grant to the applicant, on behalf of the Federal Government, subject to paragraph (3), an easement, right-of-way, or lease to perform such installation, construction, modification, or maintenance.

(2) Application.

(A) In general. The Administrator of General Services shall develop a common form for applications for easements, rights-of-way, and leases under paragraph (1) for all executive agencies that, except as provided in subparagraph (B), shall be used by all executive agencies and applicants with respect to the buildings or other property of each such agency.

(B) Exception. The requirement under subparagraph (A) for an executive agency to use the common form developed by the Administrator of General Services shall not apply to an executive agency if the head of an executive agency notifies the Administrator that the executive agency uses a substantially similar application.

(3) Timely consideration of applications.

(A) In general. Not later than 270 days after the date on which an executive agency receives a duly filed application for an easement, right-of-way, or lease under this subsection, the executive agency shall—

- (i) grant or deny, on behalf of the Federal Government, the application; and

(ii) notify the applicant of the grant or denial.

(B) Explanation of denial. If an executive agency denies an application under subparagraph (A), the executive agency shall notify the applicant in writing, including a clear statement of the reasons for the denial.

(C) Applicability of environmental laws. Nothing in this paragraph shall be construed to relieve an executive agency of the requirements of division A of subtitle III of title 54, United States Code [54 USCS §§ 3001 et seq.], or the National Environmental Policy Act of 1969 ([42 U.S.C. 4321](#) et seq.).

(D) Point of contact. Upon receiving an application under subparagraph (A), an executive agency shall designate one or more appropriate individuals within the executive agency to act as a point of contact with the applicant.

**(c) Master contracts for communications facility installation sitings.**

(1) In general. Notwithstanding section 704 of the Telecommunications Act of 1996 (*Public Law 104-104*; *110 Stat. 151*) or any other provision of law, the Administrator of General Services shall—

(A) develop one or more master contracts that shall govern the placement of communications facility installations on buildings and other property owned by the Federal Government; and

(B) in developing the master contract or contracts, standardize the treatment of the placement of communications facility installations on building rooftops or facades, the placement of communications facility installations on rooftops or inside buildings, the technology used in connection with communications facility installations placed on Federal buildings and other property, and any other key issues the Administrator of General Services considers appropriate.

(2) Applicability. The master contract or contracts developed by the Administrator of General Services under paragraph (1) shall apply to all publicly accessible buildings and other property owned by the Federal Government, unless the Administrator of General Services decides that issues with respect to the siting of a communications facility installation on a specific building or other property warrant nonstandard treatment of such building or other property.

(3) Application.

(A) In general. The Administrator of General Services shall develop a common form or set of forms for communications facility installation siting applications that, except as provided in subparagraph (B), shall be used by all executive agencies and applicants with respect to the buildings and other property of each such agency.

(B) Exception. The requirement under subparagraph (A) for an executive agency to use the common form or set of forms developed by the Administrator of General Services shall not apply to an executive agency if the head of the executive agency notifies the Administrator that the executive agency uses a substantially similar application.

**(d) Definitions.** In this section:

(1) Communications facility installation. The term “communications facility installation” includes—



**(A)** any infrastructure, including any transmitting device, tower, or support structure, and any equipment, switches, wiring, cabling, power sources, shelters, or cabinets, associated with the licensed or permitted unlicensed wireless or wireline transmission of writings, signs, signals, data, images, pictures, and sounds of all kinds; and

**(B)** any antenna or apparatus that—

**(i)** is designed for the purpose of emitting radio frequency;

**(ii)** is designed to be operated, or is operating, from a fixed location pursuant to authorization by the Federal Communications Commission or is using duly authorized devices that do not require individual licenses; and

**(iii)** is added to a tower, building, or other structure.

**(2)** Executive agency. The term “executive agency” has the meaning given such term in [\*section 102 of title 40, United States Code\*](#).

**REGULATIONS**  
FEDERAL REGULATIONS

## 40 C.F.R. §1500.1

**§ 1500.1 Purpose**

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(a) The National Environmental Policy Act (NEPA) is our basic national charter for protection of the environment. It establishes policy, sets goals (section 101), and provides means (section 102) for carrying out the policy. Section 102(2) contains "action-forcing" provisions to make sure that federal agencies act according to the letter and spirit of the Act. The regulations that follow implement section 102(2). Their purpose is to tell federal agencies what they must do to comply with the procedures and achieve the goals of the Act. The President, the federal agencies, and the courts share responsibility for enforcing the Act so as to achieve the substantive requirements of section 101.

(b) NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA. Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.

(c) Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork--even excellent paperwork--but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. These regulations provide the direction to achieve this purpose.

## 40 C.F.R. §1508.9

**§ 1508.9 Environmental assessment**

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"Environmental assessment":

- (a)** Means a concise public document for which a Federal agency is responsible that serves to:
- (1)** Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.
  - (2)** Aid an agency's compliance with the Act when no environmental impact statement is necessary.
  - (3)** Facilitate preparation of a statement when one is necessary.
- (b)** Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

## 40 C.F.R. §1508.11

**§ 1508.11 Environmental impact statement**

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"Environmental impact statement" means a detailed written statement as required by section 102(2)(C) of the Act.

## 40 C.F.R. §1508.13

**§ 1508.13 Finding of no significant impact**

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"Finding of no significant impact" means a document by a Federal agency briefly presenting the reasons why an action, not otherwise excluded (§ 1508.4), will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. It shall include the environmental assessment or a summary of it and shall note any other environmental documents related to it (§ 1501.7(a)(5)). If the assessment is included, the finding need not repeat any of the discussion in the assessment but may incorporate it by reference.

## 40 C.F.R. §1508.27

**§ 1508.27 Significantly**

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"Significantly" as used in NEPA requires considerations of both context and intensity:

**(a) Context.** This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

**(b) Intensity.** This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

**(1)** Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

**(2)** The degree to which the proposed action affects public health or safety.

**(3)** Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

**(4)** The degree to which the effects on the quality of the human environment are likely to be highly controversial.

**(5)** The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

**(6)** The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

**(7)** Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

**(8)** The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

**(9)** The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

**(10)** Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

## 47 C.F.R. §1.1310

**§ 1.1310 Radiofrequency radiation exposure limits. [Effective until June. 1, 2020]**

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[PUBLISHER'S NOTE: This section was revised at [85 FR 18131, 18145, Apr. 1, 2020](#), effective June. 1, 2020. For the convenience of the user, the section has been set out twice. The version effective until June. 1, 2020, immediately follows this note. For the version effective June. 1, 2020, see the version following this section, also numbered § 1.1310.]

(a) Specific absorption rate (SAR) shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b) within the frequency range of 100 kHz to 6 GHz (inclusive).

(b) The SAR limits for occupational/controlled exposure are 0.4 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 8 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit for occupational/controlled exposure is 20 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 6 minutes to determine compliance with occupational/controlled SAR limits.

(c) The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

(d)

(1) Evaluation with respect to the SAR limits in this section and in § 2.1093 of this chapter must demonstrate compliance with both the whole-body and peak spatial-average limits using technically supportable methods and exposure conditions in advance of authorization (licensing or equipment certification) and in a manner that permits independent assessment.

(2) At operating frequencies less than or equal to 6 GHz, the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in Table 1 of paragraph (e) of this section, may be used instead of whole-body SAR limits as set forth in paragraph (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in § 1.1307(b), except for portable devices as defined in § 2.1093 as these evaluations shall be performed according to the SAR provisions in § 2.1093 of this chapter.

(3) At operating frequencies above 6 GHz, the MPE limits shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in § 1.1307(b).

(4) Both the MPE limits listed in Table 1 of paragraph (e) of this section and the SAR limits as set forth in paragraph (a) through (c) of this section and in § 2.1093 of this chapter are for continuous exposure, that is, for indefinite time periods. Exposure levels higher than the limits



are permitted for shorter exposure times, as long as the average exposure over the specified averaging time in Table 1 is less than the limits. Detailed information on our policies regarding procedures for evaluating compliance with all of these exposure limits can be found in the FCC's OET Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," and in supplements to Bulletin 65, all available at the FCC's Internet Web site: <http://www.fcc.gov/oet/rfsafety>.

Note to paragraphs (a) through (d): SAR is a measure of the rate of energy absorption due to exposure to RF electromagnetic energy. The SAR limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized SAR in § 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE Std C95.1-1992, copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. The criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86, § 17.4.5, copyright 1986 by NCRP, Bethesda, Maryland 20814. Limits for whole body SAR and peak spatial-average SAR are based on recommendations made in both of these documents. The MPE limits in Table 1 are based generally on criteria published by the NCRP in "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86, §§ 17.4.1, 17.4.1.1, 17.4.2 and 17.4.3, copyright 1986 by NCRP, Bethesda, Maryland 20814. In the frequency range from 100 MHz to 1500 MHz, these MPE exposure limits for field strength and power density are also generally based on criteria recommended by the ANSI in § 4.1 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE Std C95.1-1992, copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017.

(e) Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

**Table 1--Limits for  
Maximum  
Permissible  
Exposure (MPE)**

Frequency range (MHz)	Electric field strength (v/m)	Magnetic field strength (A/m)	Power density (mW /m <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	* 100	6
3.0-30	1842/f	4.89/f	* 900/f mW/m <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			1.5	6

**Table 1--Limits for  
Maximum  
Permissible  
Exposure (MPE)**

Frequency range (MHz)	Electric field strength (v/m)	Magnetic field strength (A/m)	Power density (mW /m <sup>2</sup> )	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* 100	30
1.34-30	824/f	2.19/f	* 180/f mW/m <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz \* = Plane-wave equivalent power density

**(1)** Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure. The phrase fully aware in the context of applying these exposure limits means that an exposed person has received written and/or verbal information fully explaining the potential for RF exposure resulting from his or her employment. With the exception of transient persons, this phrase also means that an exposed person has received appropriate training regarding work practices relating to controlling or mitigating his or her exposure. Such training is not required for transient persons, but they must receive written and/or verbal information and notification (for example, using signs) concerning their exposure potential and appropriate means available to mitigate their exposure. The phrase exercise control means that an exposed person is allowed to and knows how to reduce or avoid exposure by administrative or engineering controls and work practices, such as use of personal protective equipment or time averaging of exposure.

**(2)** General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

**(3)** Licensees and applicants are responsible for compliance with both the occupational/controlled exposure limits and the general population/uncontrolled exposure limits as they apply to transmitters under their jurisdiction. Licensees and applicants should be aware that the occupational/controlled exposure limits apply especially in situations where

workers may have access to areas in very close proximity to antennas and access to the general public may be restricted.

**(4)** In lieu of evaluation with the general population/uncontrolled exposure limits, amateur licensees authorized under part 97 of this chapter and members of his or her immediate household may be evaluated with respect to the occupational/controlled exposure limits in this section, provided appropriate training and information has been provided to the amateur licensee and members of his/her household. Other nearby persons who are not members of the amateur licensee's household must be evaluated with respect to the general population/uncontrolled exposure limits.

## 47 C.F.R. §2.1

**§ 2.1 Terms and definitions.**

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(a) Where a term or definition appears in this part of the Commission's Rules, it shall be the definitive term or definition and shall prevail throughout the Commission's Rules.

(b) The source of each definition is indicated as follows:

CS -- Annex to the Constitution of the International Telecommunication Union (ITU)

CV -- Annex to the Convention of the ITU

FCC -- Federal Communications Commission

RR -- ITU Radio Regulations (c) The following terms and definitions are issued:

(c) The following terms and definitions are issued:

Accepted Interference. n1 Interference at a higher level than defined as permissible interference and which has been agreed upon between two or more administrations without prejudice to other administrations. (RR)

n1 The terms permissible interference and accepted interference are used in the coordination of frequency assignments between administrations.

Active Satellite. A satellite carrying a station intended to transmit or retransmit radiocommunication signals. (RR)

Active Sensor. A measuring instrument in the earth exploration-satellite service or in the space research service by means of which information is obtained by transmission and reception of radio waves. (RR)

Adaptive System. A radiocommunication system which varies its radio characteristics according to channel quality. (RR)

Administration. Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations. (CS)

Aeronautical Earth Station. An Earth station in the fixed-satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile-satellite service. (RR)

Aeronautical Fixed Service. A radiocommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air transport. (RR)

Aeronautical Fixed Station. A station in the aeronautical fixed service. (RR)

Aeronautical Mobile Off-Route (OR) Service. An aeronautical mobile service intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes. (RR)

Aeronautical Mobile Route (R) Service. An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. (RR)

Aeronautical Mobile-Satellite Off-Route (OR) Service. An aeronautical mobile-satellite service intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes. (RR)

Aeronautical Mobile-Satellite Route (R) Service. An aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes. (RR)

Aeronautical Mobile-Satellite Service. A mobile-satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Aeronautical Mobile Service. A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies. (RR)

Aeronautical Radionavigation-Satellite Service. A radionavigation-satellite service in which earth stations are located on board aircraft. (RR)

Aeronautical Radionavigation Service. A radio-navigation service intended for the benefit and for the safe operation of aircraft. (RR)

Aeronautical Station. A land station in the aeronautical mobile service.

Note: In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea. (RR)

Aircraft Earth Station. A mobile earth station in the aeronautical mobile-satellite service located on board an aircraft. (RR)

Aircraft Station. A mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft. (RR)

Allocation (of a frequency band). Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned. (RR)

Allotment (of a radio frequency or radio frequency channel). Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical area and under specified conditions. (RR)

Altitude of the Apogee or Perigee. The altitude of the apogee or perigee above a specified reference surface serving to represent the surface of the Earth. (RR)

Amateur-Satellite Service. A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service. (RR)

Amateur Service. A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest. (RR)

Amateur Station. A station in the amateur service. (RR)

Assigned Frequency. The centre of the frequency band assigned to a station. (RR)

Assigned Frequency Band. The frequency band within which the emission of a station is authorized; the width of the band equals the necessary bandwidth plus twice the absolute value of the frequency tolerance. Where space stations are concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface. (RR)

Assignment (of a radio frequency or radio frequency channel). Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions. (RR)

Base Earth Station. An earth station in the fixed-satellite service or, in some cases, in the land mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the land mobile-satellite service. (RR)

Base Station. A land station in the land mobile service. (RR)

Broadcasting-Satellite Service. A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public.

NOTE: In the broadcasting-satellite service, the term direct reception shall encompass both individual reception and community reception. (RR)

Broadcasting Service. A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission. (CS)

Broadcasting Station. A station in the broadcasting service. (RR)

Carrier Power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation. (RR)

Characteristic Frequency. A frequency which can be easily identified and measured in a given emission.

NOTE: A carrier frequency may, for example, be designated as the characteristic frequency. (RR)

Class of Emission. The set of characteristics of an emission, designated by standard symbols, e.g., type of modulation, modulating signal, type of information to be transmitted, and also if appropriate, any additional signal characteristics. (RR)

Coast Earth Station. An earth station in the fixed-satellite service or, in some cases, in the maritime mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the maritime mobile-satellite service. (RR)

Coast Station. A land station in the maritime mobile service. (RR)

Community Reception (in the broadcasting-satellite service). The reception of emissions from a space station in the broadcasting-satellite service by receiving equipment, which in some cases may be complex and have antennae larger than those for individual reception, and intended for use: (1) by a group of the general public at one location; or (2) through a distribution system covering a limited area. (RR)

Conterminous United States. The contiguous 48 States and the District of Columbia. (FCC)

Coordinated Universal Time (UTC). Time scale, based on the second (SI), as defined in Recommendation ITU-R TF.460-6.

Note: For most practical purposes associated with the ITU Radio Regulations, UTC is equivalent to mean solar time at the prime meridian (0 [degrees] longitude), formerly expressed in GMT. (RR)

Coordination Area. When determining the need for coordination, the area surrounding an earth station sharing the same frequency band with terrestrial stations, or surrounding a transmitting earth station sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

Coordination Contour. The line enclosing the coordination area. (RR)

Coordination Distance. When determining the need for coordination, the distance on a given azimuth from an earth station sharing the same frequency band with terrestrial stations, or from a transmitting earth station sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

Deep Space. Space at distance from the Earth equal to, or greater than,  $2 \times 10^6$  kilometers. (RR)

Differential Global Positioning System (DGPS) Station. A differential RNSS station for specific augmentation of GPS.

Differential Radionavigation Satellite Service (Differential RNSS) Station. A station used for the transmission of differential correction data and related information (such as ionospheric data and RNSS satellite integrity information) as an augmentation to an RNSS system for the purpose of improved navigation accuracy.

Direct Sequence Systems. A spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal.

Duplex Operation. Operating method in which transmission is possible simultaneously in both directions of a telecommunication channel. n3 (RR)

n3 In general, duplex operation and semi-duplex operation require two frequencies in radiocommunication; simplex operation may use either one or two.

Earth Exploration-Satellite Service. A radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which:

- (1) Information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from active sensors or passive sensors on Earth satellites;
- (2) Similar information is collected from airborne or Earth-based platforms;
- (3) Such information may be distributed to earth stations within the system concerned; and
- (4) Platform interrogation may be included. This service may also include feeder links necessary for its operation. (RR)

Earth Station. A station located either on the earth's surface or within the major portion of earth's atmosphere and intended for communication:

- (1) With one or more space stations; or
- (2) With one or more stations of the same kind by means of one or more reflecting satellites or other objects in space. (RR)

Effective Radiated Power (e.r.p) (in a given direction). The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction. (RR)

Emergency Position-Indicating Radiobeacon Station. A station in the mobile service the emissions of which are intended to facilitate search and rescue operations. (RR)

Emission. Radiation produced, or the production of radiation, by a radio transmitting station.



NOTE: For example, the energy radiated by the local oscillator of a radio receiver would not be an emission but a radiation. (RR)

End Product. A completed electronic device that has received all requisite FCC approvals and is suitable for marketing.

Equivalent Isotropically Radiated Power (e.i.r.p.). The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain). (RR)

Equivalent Monopole Radiated Power (e.m.r.p.) (in a given direction). The product of the power supplied to the antenna and its gain relative to a short vertical antenna in a given direction. (RR)

Equivalent Satellite Link Noise Temperature. The noise temperature referred to the output of the receiving antenna of the earth station corresponding to the radio-frequency noise power which produces the total observed noise at the output of the satellite link excluding the noise due to interference coming from satellite links using other satellites and from terrestrial systems. (RR)

Evaluation Kit. An assembly of components, subassemblies, or circuitry, including software, created by or for a component maker, system integrator, or product developer for the sole purpose of facilitating: (i) End product developer evaluation of all or some of such components, subassemblies, or circuitry, or (ii) the development of software to be used in an end product.

Experimental Station. A station utilizing radio waves in experiments with a view to the development of science or technique.

NOTE: This definition does not include amateur stations. (RR)

Facsimile. A form of telegraphy for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form. (RR)

Feeder Link. A radio link from an earth station at a given location to a space station, or vice versa, conveying information for a space radiocommunication service other than for the fixed-satellite service. The given location may be at a specified fixed point, or at any fixed point within specified areas. (RR)

Fixed-Satellite Service. A radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radiocommunication services. (RR)

Fixed Service. A radiocommunication service between specified fixed points. (RR)

Fixed Station. A station in the fixed service. (RR)

Frequency Assignment Subcommittee (FAS). A subcommittee of the Interdepartment Radio Advisory Committee (IRAC) within NTIA that develops and executes procedures for the assignment and coordination of Federal radio frequencies. (FCC)

Frequency Hopping Systems. A spread spectrum system in which the carrier is modulated with the coded information in a conventional manner causing a conventional spreading of the RF energy about the frequency carrier. The frequency of the carrier is not fixed but changes at fixed intervals under the direction of a coded sequence. The wide RF bandwidth needed by such a system is not required by



spreading of the RF energy about the carrier but rather to accommodate the range of frequencies to which the carrier frequency can hop. The test of a frequency hopping system is that the near term distribution of hops appears random, the long term distribution appears evenly distributed over the hop set, and sequential hops are randomly distributed in both direction and magnitude of change in the hop set.

Frequency-Shift Telegraphy. Telegraphy by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values. (RR)

Frequency Tolerance. The maximum permissible departure by the centre frequency of the frequency band occupied by an emission from the assigned frequency or, by the characteristic frequency of an emission from the reference frequency.

NOTE: The frequency tolerance is expressed in parts in  $10^{-6}$  or in hertz. (RR)

Full Carrier Single-Sideband Emission. A single-sideband emission without suppression of the carrier. (RR)

Gain of an Antenna. The ratio, usually expressed in decibels, of the power required at the input of a loss free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarization.

NOTE: Depending on the choice of the reference antenna a distinction is made between:

(1) Absolute or isotropic gain ( $G_i$ ), when the reference antenna is an isotropic antenna isolated in space;

(2) Gain relative to a half-wave dipole ( $G_d$ ), when the reference antenna is a half-wave dipole isolated in space whose equatorial plane contains the given direction;

(3) Gain relative to a short vertical antenna ( $G_v$ ), when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a perfectly conducting plane which contains the given direction. (RR)

General Purpose Mobile Service. A mobile service that includes all mobile communications uses including those within the Aeronautical Mobile, Land Mobile, or the Maritime Mobile Services.

Geostationary Satellite. A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a geosynchronous satellite which remains approximately fixed relative to the Earth. (RR)

Geostationary Satellite Orbit. The orbit in which a satellite must be placed to be a geostationary satellite. (RR)

Geosynchronous Satellite. An Earth satellite whose period of revolution is equal to the period of rotation of the Earth about its axis. (RR)

Government Master File (GMF). NTIA's database of Federal assignments. It also includes non-Federal authorizations coordinated with NTIA for the bands allocated for shared Federal and non-Federal use. (FCC)

Harmful Interference. Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with [the ITU] Radio Regulations. (CS)

High Altitude Platform Station (HAPS). A station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth. (RR)

Hybrid Spread Spectrum Systems. Hybrid spread spectrum systems are those which use combinations of two or more types of direct sequence, frequency hopping, time hopping and pulsed FM modulation in order to achieve their wide occupied bandwidths.

Inclination of an Orbit (of an earth satellite). The angle determined by the plane containing the orbit and the plane of the Earth's equator measured in degrees between 0 [degrees] and 180 [degrees] and in counter-clockwise direction from the Earth's equatorial plane at the ascending node of the orbit. (RR)

Individual Reception (in the broadcasting-satellite service). The reception of emissions from a space station in the broadcasting-satellite service by simple domestic installations and in particular those possessing small antennae. (RR)

Industrial, Scientific and Medical (ISM) (of radio frequency energy) Applications. Operation of equipment or appliances designed to generate and use locally radio-frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications. (RR)

Instrument Landing System (ILS). A radionavigation system which provides aircraft with horizontal and vertical guidance just before and during landing and, at certain fixed points, indicates the distance to the reference point of landing. (RR)

Instrument Landing System Glide Path. A system of vertical guidance embodied in the instrument landing system which indicates the vertical deviation of the aircraft from its optimum path of descent. (RR)

Instrument Landing System Localizer. A system of horizontal guidance embodied in the instrument landing system which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway. (RR)

Insular Area. A jurisdiction that is neither a part of one of the several States nor a Federal district. The U.S. insular areas are listed in [47 CFR 2.105\(a\)](#) at notes 2 and 3. (FCC)

Interdepartment Radio Advisory Committee (IRAC). A committee of the Federal departments, agencies, and administrations that advises NTIA in assigning frequencies to Federal radio stations and in developing and executing policies, programs, procedures, and technical criteria pertaining to the allocation, management, and use of the spectrum. The IRAC consists of a main committee, subcommittees, and several ad hoc groups that consider various aspects of spectrum management policy. The FCC serves as a member of the Frequency Assignment Subcommittee and as Liaison Representative on the main committee, all other subcommittees and ad hoc groups. (FCC)

Interference. The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication

system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy. (RR)

International Telecommunication Union (ITU). An international organization within the United Nations System where governments and the private sector coordinate global telecom networks and services. The ITU is headquartered in Geneva, Switzerland and its internet address is [www.itu.int](http://www.itu.int). (FCC)

Inter-Satellite Service. A radiocommunication service providing links between artificial satellites. (RR)

Ionospheric Scatter. The propagation of radio waves by scattering as a result of irregularities or discontinuities in the ionization of the ionosphere. (RR)

Land Earth Station. An earth station in the fixed-satellite service or, in some cases, in the mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the mobile-satellite service. (RR)

Land Mobile Earth Station. A mobile earth station in the land mobile-satellite service capable of surface movement within the geographical limits of a country or continent. (RR)

Land Mobile-Satellite Service. A mobile-satellite service in which mobile earth stations are located on land. (RR)

Land Mobile Service. A mobile service between base stations and land mobile stations, or between land mobile stations. (RR)

Land Mobile Station. A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent.

Land Station. A station in the mobile service not intended to be used while in motion. (RR)

Left-Hand (or Anti-Clockwise) Polarized Wave. An elliptically or circularly-polarized wave, in fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left hand or anti-clockwise direction. (RR)

Line A. Begins at Aberdeen, Washington running by great circle arc to the intersection of 48[degrees] N., 120[degrees] W., thence along parallel 48[degrees] N., to the intersection of 95[degrees] W., thence by great circle arc through the southernmost point of Duluth, Minn., thence by great circle arc to 45[degrees] N., 85[degrees] W., thence southward along meridian 85[degrees] W., to its intersection with parallel 41[degrees] N., thence along parallel 41[degrees] N., to its intersection with meridian 82[degrees] W., thence by great circle arc through the southernmost point of Bangor, Maine, thence by great circle arc through the southernmost point of Searsport, Maine, at which point it terminates. (FCC)

Line B. Begins at Tofino, B.C., running by great circle arc to the intersection of 50[degrees] N., 125[degrees] W., thence along parallel 50[degrees] N., to the intersection of 90[degrees] W., thence by great circle arc to the intersection of 45[degrees] N., 79[degrees]30' W., thence by great circle arc through the northernmost point of Drummondville, Quebec (Lat. 45[degrees]52' N., Long 72[degrees]30' W.), thence by great circle arc to 48[degrees]30' N., 70[degrees] W., thence by great circle arc through the northernmost point of Campbellton,

N.B., thence by great circle are through the northernmost point of Liverpool, N.S., at which point it terminates. (FCC)

Line C. Begins at the intersection of 70[degrees] N., 144[degrees] W., thence by great circle arc to the intersection of 60[degrees] N., 143[degrees] W., thence by great circle arc so as to include all of the Alaskan Panhandle. (FCC)

Line D. Begins at the intersection of 70[degrees] N., 138[degrees] W., thence by great circle arc to the intersection of 61[degrees]20' N., 139[degrees] W. (Burwash Landing), thence by great circle arc to the intersection of 60[degrees]45' N., 135[degrees] W., thence by great circle arc to the intersection of 56[degrees] N., 128[degrees] W., thence south along 128[degrees] meridian to Lat. 55[degrees] N., thence by great circle arc to the intersection of 54[degrees] N., 130[degrees] W., thence by great circle arc to Port Clements, thence to the Pacific Ocean where it ends. (FCC)

Maritime Mobile-Satellite Service. A mobile-satellite service in which mobile earth stations are located on board ships; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Maritime Mobile Service. A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Maritime Radionavigation-Satellite Service. A radionavigation-satellite service in which earth stations are located on board ships. (RR)

Maritime Radionavigation Service. A radionavigation service intended for the benefit and for the safe operation of ships. (RR)

Marker Beacon. A transmitter in the aeronautical radionavigation service which radiates vertically a distinctive pattern for providing position information to aircraft. (RR)

Mean Power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions. (RR)

Meteorological Aids Service. A radiocommunication service used for meteorological, including hydrological, observation and exploration. (RR)

Meteorological-Satellite Service. An earth exploration-satellite service for meteorological purposes. (RR)

Mobile Earth Station. An earth station in the mobile-satellite service intended to be used while in motion or during halts at unspecified points. (RR)

Mobile-Satellite Service. A radiocommunication service:

(1)Between mobile earth stations and one or more space stations, or between space stations used by this service; or

(2)Between mobile earth stations by means of one or more space stations.

NOTE: This service may also include feeder links necessary for its operation. (RR)

Mobile Service. A radiocommunication service between mobile and land stations, or between mobile stations. (CV)

**Mobile Station.** A station in the mobile service intended to be used while in motion or during halts at unspecified points. (RR)

**Multi-Satellite Link.** A radio link between a transmitting earth station and a receiving earth station through two or more satellites, without any intermediate earth station.

**NOTE:** A multisatellite link comprises one up-link, one or more satellite-to-satellite links and one down-link. (RR)

**National Telecommunications and Information Administration (NTIA).** An agency of the United States Department of Commerce that serves as the President's principal advisor on telecommunications and information policy issues. NTIA manages Federal use of the radio spectrum and coordinates Federal use with the FCC. NTIA sets forth regulations for Federal use of the radio spectrum within its Manual of Regulations & Procedures for Federal Radio Frequency Management (NTIA Manual) . (FCC)

**Necessary Bandwidth.** For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions. (RR)

**Non-Voice, Non-Geostationary Mobile-Satellite Service.** A mobile-satellite service reserved for use by non-geostationary satellites in the provision of non-voice communications which may include satellite links between land earth stations at fixed locations.

**Occupied Bandwidth.** The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage  $[\beta]/2$  of the total mean power of a given emission.

**Note:** Unless otherwise specified in an ITU-R Recommendation for the appropriate class of emission, the value of  $[\beta]/2$  should be taken as 0.5%. (RR).

**On-Board Communication Station.** A low-powered mobile station in the maritime mobile service intended for use for internal communications on board a ship, or between a ship and its lifeboats and life-rafts during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions. (RR)

**Orbit.** The path, relative to a specified frame of reference, described by the centre of mass of a satellite or other object in space subjected primarily to natural forces, mainly the force of gravity. (RR)

**Out-of-band domain (of an emission).** The frequency range, immediately outside the necessary bandwidth but excluding the spurious domain, in which out-of-band emissions generally predominate. Out-of-band emissions, defined based on their source, occur in the out-of-band domain and, to a lesser extent, in the spurious domain. Spurious emissions likewise may occur in the out-of-band domain as well as in the spurious domain. (RR)

**Out-of-band Emission.** Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions. (RR)

Passive Sensor. A measuring instrument in the earth exploration-satellite service or in the space research service by means of which information is obtained by reception of radio waves of natural origin. (RR)

Peak Envelope Power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions. (RR)

Period (of a satellite). The time elapsing between two consecutive passages of a satellite through a characteristic point on its orbit. (RR)

Permissible Interference. <sup>n3</sup> Observed or predicted interference which complies with quantitative interference and sharing criteria contained in these [ITU Radio] Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations. (RR)

<sup>n3</sup> See footnote under Accepted Interference.

Port Operations Service. A maritime mobile service in or near a port, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons.

NOTE: Messages which are of a public correspondence nature shall be excluded from this service. (RR)

Port Station. A coast station in the port operations service. (RR)

**Power.** Whenever the power of a radio transmitter, etc. is referred to it shall be expressed in one of the following forms, according to the class of emission, using the arbitrary symbols indicated:

(1) Peak envelope power (PX or pX);

(2) Mean power (PY or pY);

(3) Carrier power (PZ or pZ).

Note 1: For different classes of emission, the relationships between peak envelope power, mean power and carrier power, under the conditions of normal operation and of no modulation, are contained in ITU-R Recommendations which may be used as a guide.

Note 2: For use in formulae, the symbol p denotes power expressed in watts and the symbol P denotes power expressed in decibels relative to a reference level. (RR)

Primary Radar. A radiodetermination system based on the comparison of reference signals with radio signals reflected from the position to be determined. (RR)

Protection Ratio. The minimum value of the wanted-to-unwanted signal ratio, usually expressed in decibels, at the receiver input determined under specified conditions such that a specified reception quality of the wanted signal is achieved at the receiver output. (RR)

Public Correspondence. Any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission. (CS)

Pulsed FM Systems. A pulsed FM system is a spread spectrum system in which a RF carrier is modulated with a fixed period and fixed duty cycle sequence. At the beginning of each transmitted pulse, the carrier frequency is frequency modulated causing an additional spreading of the carrier. The pattern of the frequency modulation will depend upon the spreading function which is chosen. In some systems the spreading function is a linear FM chirp sweep, sweeping either up or down in frequency.

**Radar.** A radiodetermination system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined. (RR)

Radar Beacon (RACON). A transmitter-receiver associated with a fixed navigational mark which, when triggered by a radar, automatically returns a distinctive signal which can appear on the display of the triggering radar, providing range, bearing and identification information. (RR)

Radiation. The outward flow of energy from any source in the form of radio waves. (RR)

**Radio.** A general term applied to the use of radio waves. (RR)

Radio Altimeter. Radionavigation equipment, on board an aircraft or spacecraft or the spacecraft above the Earth's surface or another surface. (RR)

Radio Astronomy. Astronomy based on the reception of radio waves of cosmic origin. (RR)

Radio Astronomy Service. A service involving the use of radio astronomy. (RR)

Radio Astronomy Station. A station in the radio astronomy service. (RR)

Radiobeacon Station. A station in the radionavigation service the emissions of which are intended to enable a mobile station to determine its bearing or direction in relation to radiobeacon station. (RR)

Radiocommunication. Telecommunication by means of radio waves. (CS) (CV)

Radiocommunication Service. A service as defined in this Section involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes.

NOTE: In these [international] Radio Regulations, unless otherwise stated, any radiocommunication service relates to terrestrial radiocommunication. (RR)

Radiodetermination. The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves. (RR)



Radiodetermination-Satellite Service. A radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations. This service may also include feeder links necessary for its own operation. (RR)

Radiodetermination Service. A radiocommunication service for the purpose of radiodetermination. (RR)

Radiodetermination Station. A station in the radiodetermination service. (RR)

Radio Direction-Finding. Radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object. (RR)

Radio Direction-Finding Station. A radiodetermination station using radio direction-finding. (RR)

Radiolocation. Radiodetermination used for purposes other than those of radionavigation. (RR)

Radiolocation Land Station. A station in the radiolocation service not intended to be used while in motion. (RR)

Radiolocation Mobile Station. A station in the radiolocation service intended to be used while in motion or during halts at unspecified points. (RR)

Radiolocation Service. A radiodetermination service for the purpose of radiolocation. (RR)

Radionavigation. Radiodetermination used for the purposes of navigation, including obstruction warning.

Radionavigation Land Station. A station in the radionavigation service not intended to be used while in motion. (RR)

Radionavigation Mobile Station. A station in the radionavigation service intended to be used while in motion or during halts at unspecified points. (RR)

Radionavigation-Satellite Service. A radiodetermination-satellite service used for the purpose of radionavigation. This service may also include feeder links necessary for its operation. (RR)

Radionavigation Service. A radiodetermination service for the purpose of radionavigation. (RR)

Radiosonde. An automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free balloon, kite or parachute, and which transmits meteorological data. (RR)

Radiotelegram. A telegram, originating in or intended for a mobile station or a mobile earth station transmitted on all or part of its route over the radiocommunication channels of the mobile service or of the mobile-satellite service. (RR)

Radiotelemetry. Telemetry by means of radio waves. (RR)

Radiotelephone Call. A telephone call, originating in or intended for a mobile station or a mobile earth station, transmitted on all or part of its



route over the radiocommunication channels of the mobile service or of the mobile-satellite service. (RR)

Radiotelex Call. A telex call, originating in or intended for a mobile station or a mobile earth station, transmitted on all or part of its route over the radiocommunication channels of the mobile service or the mobile-satellite service. (RR)

Radio Waves or Hertzian Waves. Electromagnetic waves of frequencies arbitrarily lower than 3,000 GHz, propagated in space without artificial guide. (RR)

Reduced Carrier Single-Sideband Emission. A single-sideband emission in which the degree of carrier suppression enables the carrier to be reconstituted and to be used for demodulation. (RR)

Reference Frequency. A frequency having a fixed and specified position with respect to the assigned frequency. The displacement of this frequency with respect to the assigned frequency has the same absolute value and sign that the displacement of the characteristic frequency has with respect to the centre of the frequency band occupied by the emission. (RR)

Reflecting Satellite. A satellite intended to reflect radiocommunication signals. (RR)

Right-Hand (or Clockwise) Polarized Wave. An Elliptically or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right-hand or clockwise direction. (RR)

Safety Service. Any radiocommunication service used permanently or temporarily for the safeguarding of human life and property. (RR)

Satellite. A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body. (RR)

Satellite Link. A radio link between a transmitting earth station and a receiving earth station through one satellite. A satellite link comprises one up-link and one down-link. (RR)

Satellite Network. A satellite system or a part of a satellite system, consisting of only one satellite and the cooperating earth stations. (RR)

Satellite System. A space system using one or more artificial earth satellites. (RR)

Secondary Radar. A radiodetermination system based on the comparison of reference signals with radio signals retransmitted from the position to be determined. (RR)

Semi-Duplex Operation. fn4 A method which is simplex operation on one end of the circuit and duplex operation at the other. (RR)

Ship Earth Station. A mobile earth station in the maritime mobile-satellite service located on board ship. (RR)

Ship Movement Service. A safety service in the maritime mobile service other than a port operations service, between coast stations and ship

stations, or between ship stations, in which messages are restricted to those relating to the movement of ships. Messages which are of a public correspondence nature shall be excluded from this service. (RR)

Ship's Emergency Transmitter. A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes. (RR)

Ship Station. A mobile station in the maritime mobile service located on board a vessel which is not permanently moored, other than a survival craft station. (RR)

Simplex Operation. n4 Operating method in which transmission is made possible alternatively in each direction of a telecommunication channel, for example, by means of manual control.

n4 See footnote under Duplex Operation.

Single-Sideband Emission. An amplitude modulated emission with one sideband only. (RR)

Software defined radio. A radio that includes a transmitter in which the operating parameters of frequency range, modulation type or maximum output power (either radiated or conducted), or the circumstances under which the transmitter operates in accordance with Commission rules, can be altered by making a change in software without making any changes to hardware components that affect the radio frequency emissions. In accordance with § 2.944 of this part, only radios in which the software is designed or expected to be modified by a party other than the manufacturer and would affect the above-listed operating parameters or circumstances under which the radio transmits must be certified as software defined radios.

Spacecraft. A man-made vehicle which is intended to go beyond the major portion of the Earth's atmosphere. (RR)

Space Operation Service. A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand.

NOTE: These functions will normally be provided within the service in which the space station is operating. (RR)

Space Radiocommunication. Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space. (RR)

Space Research Service. A radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. (RR)

Space Station. A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere. (RR)

Space System. Any group of cooperating Earth stations and/or space stations employing space radiocommunication for specific purposes. (RR)

Space Telecommand. The use of radiocommunication for the transmission of signals to a space station to initiate, modify or terminate functions of equipment on a space object, including the space station. (RR)

Space Telemetry. The use of telemetry for transmission for a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft. (RR)

Space Tracking. Determination of the orbit, velocity or instantaneous position of an object in space by means of radiodetermination, excluding primary radar, for the purpose of following the movement of the object. (RR)

Special Service. A radiocommunication service, not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to public correspondence. (RR)

Spread Spectrum Systems. A spread spectrum system is an information bearing communications system in which: (1) Information is conveyed by modulation of a carrier by some conventional means, (2) the bandwidth is deliberately widened by means of a spreading function over that which would be needed to transmit the information alone. (In some spread spectrum systems, a portion of the information being conveyed by the system may be contained in the spreading function.)

Spurious domain (of an emission): The frequency range beyond the out-of-band domain in which spurious emissions generally predominate. (RR)

Spurious Emission. Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions. (RR)

Standard Frequency and Time Signal-Satellite Service. A radiocommunication service using space stations on earth satellites for the same purposes as those of the standard frequency and time signal service.

NOTE: This service may also include feeder links necessary for its operation. (RR)

Standard Frequency and Time Signal Service. A radiocommunication service for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception. (RR)

Standard Frequency and Time Signal Station. A station in the standard frequency and time signal service. (RR)

Station. One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service.

NOTE: Each station shall be classified by the service in which it operates permanently or temporarily. (RR)

Suppressed Carrier Single-Sideband Emission. A single-sideband emission in which the carrier is virtually suppressed and not intended to be used for demodulation. (RR)

Survival Craft Station. A mobile station in the maritime mobile service or the aeronautical mobile service intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment. (RR)

Telecommand. The use of telecommunication for the transmission of signals to initiate, modify or terminate functions of equipment at a distance. (RR)

Telecommunication. Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems. (CS)

Telegram. Written matter intended to be transmitted by telegraphy for delivery to the addressee. This term also includes radiotelegrams unless otherwise specified. (CS)

NOTE: In this definition the term telegraphy has the same general meaning as defined in the Convention.

Telegraphy. n5 A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use. (CS)

n5 A graphic document records information in a permanent form and is capable of being filed and consulted; it may take the form of written or printed matter or of a fixed image.

Telemetry. The use of telecommunication for automatical indicating or recording measurements at a distance from the measuring instrument. (RR)

Telephony. A form of telecommunication primarily intended for the exchange of information in the form of speech. (CS)

Television. A form of telecommunication for the transmission of transient images of fixed or moving objects. (RR)

Terrestrial Radiocommunication. Any radiocommunication other than space radiocommunication or radio astronomy. (RR)

Terrestrial Station. A station effecting terrestrial radiocommunication.

NOTE: In these [international Radio] Regulations, unless otherwise stated, any station is a terrestrial station. (RR)

Time Hopping Systems. A time hopping system is a spread spectrum system in which the period and duty cycle of a pulsed RF carrier are varied in a pseudorandom manner under the control of a coded sequence. Time hopping is often used effectively with frequency hopping to form a hybrid time-division, multiple-access (TDMA) spread spectrum system.

Transponder. A transmitter-receiver facility the function of which is to transmit signals automatically when the proper interrogation is received. (FCC)

Tropospheric Scatter. The propagation of radio waves by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere. (RR)

Unwanted Emissions. Consist of spurious emissions and out-of-band emissions. (RR)

## 47 C.F.R. §2.201

**§ 2.201 Emission, modulation, and transmission characteristics.**

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The following system of designating emission, modulation, and transmission characteristics shall be employed.

**(a)**Emissions are designated according to their classification and their necessary bandwidth.

**(b)**Three symbols are used to describe the basic characteristics of emissions. Emissions are classified and symbolized according to the following characteristics:

**(1)**First symbol--type of modulation of the main carrier;

**(2)**Second symbol--nature of signal(s) modulating the main carrier;

**(3)**Third symbol--type of information to be transmitted.

Note to paragraph (b): Two additional symbols for the classification of emissions may be added for a more complete description of an emission. See Appendix 1, Sub-Section IIB of the ITU Radio Regulations for the specifications of these fourth and fifth symbols. Use of these symbols is not required by the Commission.

**(c)**First Symbol--types of modulation of the main carrier:

(1) Emission of an unmodulated carrier	N
(2) Emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle-modulated):	
-- Double-sideband	A
-- Single-sideband, full carrier	H
-- Single-sideband, reduced or variable level carrier	R
-- Single-sideband, suppressed carrier	J
-- Independent sidebands	B
-- Vestigial sideband	C
(3) Emission in which the main carrier is angle-modulated:	
-- Frequency modulation	F
-- Phase modulation	G

Note: Whenever frequency modulation "F" is indicated, Phase modulation "G" is also acceptable.

(4) Emission in which the main carrier is amplitude and angle-modulated either simultaneously or in a pre-established sequence

(5) Emission of pulses: fn1

-- Sequence of unmodulated pulses	P
-- A sequence of pulses:	
-- Modulated in amplitude	K
-- Modulated in width/duration	L
-- Modulated in position/phase	M
-- In which the carrier is angle-modulated during the period of the pulse	Q
-- Which is a combination of the foregoing or is produced by other means	V
(6) Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: amplitude, angle, pulse	W
(7) Cases not otherwise covered	X

fn1 Emissions where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g. pulse code modulation) should be designated under (2) or (3).

**(d)**Second Symbol--nature of signal(s) modulating the main carrier:

(1) No modulating signal	0
(2) A single channel containing quantized or digital information without the use of a modulating sub-carrier, excluding time-division multiplex	1
(3) A single channel containing quantized or digital information with the use of a modulating sub-carrier, excluding time-division multiplex	2
(4) A single channel containing analogue information	3
(5) Two or more channels containing quantized or digital information	7
(6) Two or more channels containing analogue information	8
(7) Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information	9
(8) Cases not otherwise covered	X

**(e)**Third Symbol--type of information to be transmitted: fn2

(1) No information transmitted	N
(2) Telegraphy -- for aural reception	A

(3) Telegraphy -- for automatic reception	B
(4) Facsimile	C
(5) Data transmission, telemetry, telecommand	
(6) Telephony (including sound broadcasting)	E
(7) Television (video)	F
(8) Combination of the above	W
(9) Cases not otherwise covered	X

fn2 In this context the word "information" does not include information of a constant, unvarying nature such as is provided by standard frequency emissions, continuous wave and pulse radars, etc.

**(f)**Type B emission: As an exception to the above principles, damped waves are symbolized in the Commission's rules and regulations as type B emission. The use of type B emissions is forbidden.

**(g)**Whenever the full designation of an emission is necessary, the symbol for that emission, as given above, shall be preceded by the necessary bandwidth of the emission as indicated in § 2.202(b)(1).



## 47 C.F.R. §2.1049

**§ 2.1049 Measurements required: Occupied bandwidth.**

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The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

**(a)** Radiotelegraph transmitters for manual operation when keyed at 16 dots per second.

**(b)** Other keyed transmitters -- when keyed at the maximum machine speed.

**(c)** Radiotelephone transmitters equipped with a device to limit modulation or peak envelope power shall be modulated as follows. For single sideband and independent sideband transmitters, the input level of the modulating signal shall be 10 dB greater than that necessary to produce rated peak envelope power.

**(1)** Other than single sideband or independent sideband transmitters -- when modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.

**(2)** Single sideband transmitters in A3A or A3J emission modes -- when modulated by two tones at frequencies of 400 Hz and 1800 Hz (for 3.0 kHz authorized bandwidth), or 500 Hz and 2100 Hz (for 3.5 kHz authorized bandwidth), or 500 Hz and 2400 Hz (for 4.0 kHz authorized bandwidth), applied simultaneously. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

**(3)** Single sideband transmitters in the A3H emission mode -- when modulated by one tone at a frequency of 1500 Hz (for 3.0 kHz authorized bandwidth), or 1700 Hz (for 3.5 kHz authorized bandwidth), or 1900 Hz (for 4.0 kHz authorized bandwidth), the level of which is adjusted to produce a radio frequency signal component equal in magnitude to the magnitude of the carrier in this mode.

**(4)** As an alternative to paragraphs (c) (2) and (3) of this section, other tones besides those specified may be used as modulating frequencies, upon a sufficient showing of need. However, any tones so chosen must not be harmonically related, the third and fifth order intermodulation products which occur must fall within the -25 dB step of the emission bandwidth limitation curve, the seventh and ninth order products must fall within the -35 dB step of the referenced curve and the eleventh and all higher order products must fall beyond the -35 dB step of the referenced curve.

**(5)** Independent sideband transmitters having two channels -- when modulated by 1700 Hz tones applied simultaneously to both channels. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

**(d)** Radiotelephone transmitters without a device to limit modulation or peak envelope power shall be modulated as follows. For single sideband and independent sideband transmitters, the input level of the modulating signal should be that necessary to produce rated peak envelope power.

(1) Other than single sideband or independent sideband transmitters -- when modulated by a 2500 Hz tone of sufficient level to produce at least 85 percent modulation. If 85 percent modulation is unattainable, the highest percentage modulation shall be used.

(2) Single sideband transmitters in A3A or A3J emission modes -- when modulated by two tones at frequencies of 400 Hz and 1800 Hz (for 3.0 kHz authorized bandwidth), or 500 Hz and 2100 Hz (for 3.5 kHz authorized bandwidth), or 500 Hz and 2400 Hz (for 4.0 kHz authorized bandwidth), applied simultaneously. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

(3) Single sideband transmitters in the A3H emission mode -- when modulated by one tone at a frequency of 1500 Hz (for 3.0 kHz authorized bandwidth), or 1700 Hz (for 3.5 kHz authorized bandwidth), or 1900 Hz (for 4.0 kHz authorized bandwidth), the level of which is adjusted to produce a radio frequency signal component equal in magnitude to the magnitude of the carrier in this mode.

(4) As an alternative to paragraphs (d) (2) and (3) of this section, other tones besides those specified may be used as modulating frequencies, upon a sufficient showing of need. However any tones so chosen must not be harmonically related, the third and fifth order intermodulation products which occur must fall within the -25 dB step of the emission bandwidth limitation curve, the seventh and ninth order products must fall within the -35 dB step of the referenced curve and the eleventh and all higher order products must fall beyond the -35 dB step of the referenced curve.

(5) Independent sideband transmitters having two channels -- when modulated by 1700 Hz tones applied simultaneously to both channels. The input levels of the tones shall be so adjusted that the two principal frequency components of the radio frequency signal produced are equal in magnitude.

**(e) Transmitters for use in the Radio Broadcast Services:**

(1) AM broadcast transmitters for monaural operation -- when amplitude modulated 85% by a 7,500 Hz input signal.

(2) AM broadcast stereophonic operation -- when the transmitter operated under any stereophonic modulation condition not exceeding 100% on negative peaks and tested under the conditions specified in § 73.128 in Part 73 of the FCC rules for AM broadcast stations.

(3) FM broadcast transmitter not used for multiplex operation -- when modulated 85 percent by a 15 kHz input signal.

(4) FM broadcast transmitters for multiplex operation under Subsidiary Communication Authorization (SCA) -- when carrier is modulated 70 percent by a 15 kHz main channel input signal, and modulated an additional 15 percent simultaneously by a 67 kHz subcarrier (unmodulated).

(5) FM broadcast transmitter for stereophonic operation -- when modulated by a 15 kHz input signal to the main channel, a 15 kHz input signal to the stereophonic subchannel, and the pilot subcarrier simultaneously. The input signals to the main channel and stereophonic subchannel each shall produce 38 percent modulation of the carrier. The pilot subcarrier should produce 9 percent modulation of the carrier.

**(6)**Television broadcast monaural transmitters -- when modulated 85% by a 15 kHz input signal.

**(7)**Television broadcast stereophonic sound transmitters -- when the transmitter is modulated with a 15 kHz input signal to the main channel and the stereophonic subchannel, any pilot subcarrier(s) and any unmodulated auxiliary subcarrier(s) which may be provided. The signals to the main channel and the stereophonic subchannel must be representative of the system being tested and when combined with any pilot subcarrier(s) or other auxiliary subcarriers shall result in 85% deviation of the maximum specified aural carrier deviation.

**(f)**Transmitters for which peak frequency deviation (D) is determined in accordance with § 2.202(f), and in which the modulating baseband comprises more than 3 independent speech channels -- when modulated by a test signal determined in accordance with the following:

**(1)**A modulation reference level is established for the characteristic baseband frequency. (Modulation reference level is defined as the average power level of a sinusoidal test signal delivered to the modulator input which provides the specified value of per-channel deviation.)

**(2)**Modulation reference level being established, the total rms deviation of the transmitter is measured when a test signal consisting of a band of random noise extending from below 20 kHz to the highest frequency in the baseband, is applied to the modulator input through any preemphasis networks used in normal service. The average power level of the test signal shall exceed the modulation reference level by the number of decibels determined using the appropriate formula in the following table:

Number of message circuits that modulate the transmitter	Number of dB by which the average power (Pavg) level test signal shall exceed the modulation reference level	Limits of Pavg (dBmO)
More than 3, but less than	To be specified by the equipment manufacturer subject to FCC approval	
At least 12, but less than 60	$X+2 \log[10] N[c]$	X: - 2 to +2.6
At least 60, but less than 240	$X+4 \log[10] N[c]$	X: - 5.6 to - 1.0
240 or more	$X+10 \log[10] N[c]$	X: - 19.6 to - 15.0

Where X represents the average power in a message circuit in dBmO; Nc is the number of circuits in the multiplexed message load. Pavg shall be selected by the transmitter manufacturer and included with the technical data submitted with the application for type acceptance. (See § 2.202(e) in this chapter.)

**(g)**Transmitters in which the modulating baseband comprises not more than three independent channels -- when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.

**(h)**Transmitters employing digital modulation techniques -- when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

**(i)**Transmitters designed for other types of modulation -- when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

## 47 C.F.R. §15.231

**§ 15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.**

(a) The provisions of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

(b) In addition to the provisions of § 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	fn1 1,250 to 3,750	fn1 125 to 375
174-260	3,750	375
260-470	fn1 3,750 to 12,500	fn1 375 to 1,250
Above 470	12,500	1,250

fn1 Linear interpolations.

**(1)**The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

**(2)**Intentional radiators operating under the provisions of this Section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in § 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of § 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

**(3)**The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

**(c)**The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

**(d)**For devices operating within the frequency band 40.66-40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be [+/-] 0.01%. This frequency tolerance shall be maintained for a temperature variation of - 20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

**(e)**Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500 fn1	50 to 150 m1
174-260	1,500	150
260-470	1,500 to 5,000 fn1	150 to 500 m1
Above 470	5,000	500

fn1 Linear interpolations.

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

## 47 C.F.R. §73.128

**§ 73.128 AM Stereophonic Broadcasting.**

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(a) An Am broadcast station may, without specific authority from the FCC, transmit stereophonic programs upon installation of type accepted stereophonic transmitting equipment and the necessary measuring equipment to determine that the stereophonic transmissions conform to the modulation characteristics specified in paragraphs (b) and (c) of this section. Stations transmitting stereophonic programs prior to March 21, 1994 may continue to do so until March 21, 1995 as long as they continue to comply with the rules in effect prior to March 21, 1994.

(b) The following limitations on the transmitted wave must be met to insure compliance with the occupied bandwidth limitations, compatibility with AM receivers using envelope detectors, and any applicable international agreements to which the FCC is a party:

(1) The transmitted wave must meet the occupied bandwidth specifications of § 73.44 under all possible conditions of program modulation. Compliance with requirement shall be demonstrated either by the following specific modulation tests or other documented test procedures that are to be fully described in the application for type acceptance and the transmitting equipment instruction manual. (See § 2.983(d)(8) and (j)).

(i) Main channel (L+R) under all conditions of amplitude modulations for the stereophonic system but not exceeding amplitude modulation on negative peaks of 100%.

(ii) Stereophonic (L-R) modulated with audio tones of the same amplitude at the transmitter input terminals as in paragraph (b)(i) of this section but with the phase of either the L or R channel reversed.

(iii) Left and Right Channel only, under all conditions of modulation for the stereophonic system in use but not exceeding amplitude modulation on negative peaks of 100%.

(c) Effective on December 20, 1994, stereophonic transmissions shall conform to the following additional modulation characteristics:

(1) The audio response of the main (L+R) channel shall conform to the requirements of the ANSI/EIA-549-1988, NRSC-1 AM Preemphasis/Deemphasis and Broadcast Transmission Bandwidth Specifications (NRSC-1).

(2) The left and right channel audio signals shall conform to frequency response limitations dictated by ANSI/EIA-549-1988.

(3) The stereophonic difference (L-R) information shall be transmitted by varying the phase of the carrier in accordance with the following relationship:

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where:

L(t)=audio signal left channel,

R(t)=audio signal right channel,

m=modulation factor, and

$m [\text{peak}](L(t)+R(t))=1$  for 100% amplitude modulation,

$m [\text{peak}](L(t)-R(t))=1$  for 100% phase modulation.

(4) The carrier phase shall advance in a positive direction when a left channel signal causes the transmitter envelope to be modulated in a positive direction. The carrier phase shall



likewise retard (negative phase change) when a right channel signal causes the transmitter envelope to be modulated in a positive direction. The phase modulation shall be symmetrical for the condition of difference (L-R) channel information sent without the presence of envelope modulation.

**(5)** Maximum angular modulation, which occurs on negative peaks of the left or right channel with no signal present on the opposite channel ( $L(t)=-0.75$ ,  $R(t)=0$ , or  $R(t)=-0.75$ ,  $L(t)=0$ ) shall not exceed 1.25 radians.

**(6)** A peak phase modulation of  $\pm 0.785$  radians under the condition of difference (L-R) channel modulation and the absence of envelope (L+R) modulation and pilot signal shall represent 100% modulation of the difference channel.

**(7)** The composite signal shall contain a pilot tone for indication of the presence of stereophonic information. The pilot tone shall consist of a 25 Hz tone, with 3% or less total harmonic distortion and a frequency tolerance of  $\pm 0.1$  Hz, which modulates the carrier phase  $\pm 0.05$  radians peak, corresponding to 5% L-R modulation when no other modulation is present. The injection level shall be 5%, with a tolerance of  $\pm 1$ , -1%.

**(8)** The composite signal shall be described by the following expression:

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where:

A=the unmodulated carrier voltage

m=the modulation index

C [sn] = the magnitude of the nth term of the sum signal

C [dn] = the magnitude of the nth term of the difference signal

$\omega$  [sn] = the nth order angular velocity of the sum signal

$\omega$  [dn] = the nth order angular velocity of the difference signal

$\omega$  [c] = the angular velocity of the carrier

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A [sn] and B [sn] are the n<sup>th</sup> sine and cosine coefficients of C [sn]

A [dn] and B [dn] are the n<sup>th</sup> sine and cosine coefficients of C [dn]

## 47 C.F.R. §73.681

**§ 73.681 Definitions.**

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Amplitude modulation (AM). A system of modulation in which the envelope of the transmitted wave contains a component similar to the wave form of the signal to be transmitted.

Antenna electrical beam tilt. The shaping of the radiation pattern in the vertical plane of a transmitting antenna by electrical means so that maximum radiation occurs at an angle below the horizontal plane.

Antenna height above average terrain. The average of the antenna heights above the terrain from approximately 3.2 (2 miles) to 16.1 kilometers (10 miles) from the antenna for the eight directions spaced evenly for each 45 degrees of azimuth starting with True North. (In general, a different antenna height will be determined in each direction from the antenna. The average of these various heights is considered the antenna height above the average terrain. In some cases less than 8 directions may be used. See § 73.684(d)). Where circular or elliptical polarization is employed, the antenna height above average terrain shall be based upon the height of the radiation center of the antenna which transmits the horizontal component of radiation.

Antenna mechanical beam tilt. The intentional installation of a transmitting antenna so that its axis is not vertical, in order to change the normal angle of maximum radiation in the vertical plane.

Antenna power gain. The square of the ratio of the root-mean-square free space field strength produced at 1 kilometer in the horizontal plane, in millivolts per meter for one kW antenna input power to 221.4 mV/m. This ratio should be expressed in decibels (dB). (If specified for a particular direction, antenna power gain is based on the field strength in that direction only.)

Aspect ratio. The ratio of picture width to picture height as transmitted.

Aural center frequency. (1) The average frequency of the emitted wave when modulated by a sinusoidal signal; (2) the frequency of the emitted wave without modulation.

Aural transmitter. The radio equipment for the transmission of the aural signal only.

Auxiliary facility. An auxiliary facility is an antenna separate from the main facility's antenna, permanently installed on the same tower or at a different location, from which a station may broadcast for short periods without prior Commission authorization or notice to the Commission while the main facility is not in operation (e.g., where tower work necessitates turning off the main antenna or where lightning has caused damage to the main antenna or transmission system) (See § 73.1675).

**BTSC.** Broadcast Television systems committee recommendation for multichannel television sound transmission and audio processing as defined in FCC Bulletin OET 60.

Baseband. Aural transmitter input signals between 0 and 120 kHz.

Blanking level. The level of the signal during the blanking interval, except the interval during the scanning synchronizing pulse and the chrominance subcarrier synchronizing burst.

Chrominance. The colorimetric difference between any color and a reference color of equal luminance, the reference color having a specific chromaticity.

Chrominance subcarrier. The carrier which is modulated by the chrominance information.

Color transmission. The transmission of color television signals which can be reproduced with different values of hue, saturation, and luminance.

**Effective radiated power.** The product of the antenna input power and the antenna power gain. This product should be expressed in kW and in dB above 1 kW (dBk). (If specified for a particular direction, effective radiated power is based on the antenna power gain in that direction only. The licensed effective radiated power is based on the maximum antenna power gain. When a station is authorized to use a directional antenna or an antenna beam tilt, the direction of the maximum effective radiated power will be specified.) Where circular or elliptical polarization is employed, the term effective radiated power is applied separately to the horizontally and vertically polarized components of radiation. For assignment purposes, only the effective radiated power authorized for the horizontally polarized component will be considered.

**Equivalent isotropically radiated power (EIRP).** The term "equivalent isotropically radiated power" (also known as "effective radiated power above isotropic") means the product of the antenna input power and the antenna gain in a given direction relative to an isotropic antenna.

**Field.** Scanning through the picture area once in the chosen scanning pattern. In the line interlaced scanning pattern of two to one, the scanning of the alternate lines of the picture area once.

**Frame.** Scanning all of the picture area once. In the line interlaced scanning pattern of two to one, a frame consists of two fields.

**Free space field strength.** The field strength that would exist at a point in the absence of waves reflected from the earth or other reflecting objects.

**Frequency departure.** The amount of variation of a carrier frequency or center frequency from its assigned value.

**Frequency deviation.** The peak difference between the instantaneous frequency of the modulated wave and the carrier frequency.

**Frequency modulation (FM).** A system of modulation where the instantaneous radio frequency varies in proportion to the instantaneous amplitude of the modulating signal (amplitude of modulating signal to be measured after pre-emphasis, if used) and the instantaneous radio frequency is independent of the frequency of the modulating signal.

**Frequency swing.** The peak difference between the maximum and the minimum values of the instantaneous frequency of the carrier wave during modulation.

**Interlaced scanning.** A scanning process in which successively scanned lines are spaced an integral number of line widths, and in which the adjacent lines are scanned during successive cycles of the field frequency.

**IRE standard scale.** A linear scale for measuring, in IRE units, the relative amplitudes of the components of a television signal from a zero reference at blanking level, with picture information falling in the positive, and synchronizing information in the negative domain.

**Note:** When a carrier is amplitude modulated by a television signal in accordance with § 73.682, the relationship of the IRE standard scale to the conventional measure of modulation is as follows:

Level	IRE standard scale (units)	Modulation percentage
Zero carrier	120	0
Reference white	100	12.5
Blanking	0	75

Level	IRE standard scale (units)	Modulation percentage
Synchronizing peaks (maximum carrier level)	- 40	100

Luminance. Luminous flux emitted, reflected, or transmitted per unit solid angle per unit projected area of the source.

Main channel. The band of frequencies from 50 to 15,000 Hertz which frequency modulate the main aural carrier.

Monochrome transmission. The transmission of television signals which can be reproduced in gradations of a single color only.

Multichannel Television Sound (MTS). Any system of aural transmission that utilizes aural baseband operation between 15 kHz and 120 kHz to convey information or that encodes digital information in the video portion of the television signal that is intended to be decoded as audio information.

Multiplex Transmission (Aural). A subchannel added to the regular aural carrier of a television broadcast station by means of frequency modulated subcarriers.

Negative transmission. Where a decrease in initial light intensity causes an increase in the transmitted power.

Peak power. The power over a radio frequency cycle corresponding in amplitude to synchronizing peaks.

Percentage modulation. As applied to frequency modulation, the ratio of the actual frequency deviation to the frequency deviation defined as 100% modulation expressed in percentage. For the aural transmitter of TV broadcast stations, a frequency deviation of 0825 kHz is defined as 100% modulation.

Pilot subcarrier. A subcarrier used in the reception of TV stereophonic aural or other subchannel broadcasts.

Polarization. The direction of the electric field as radiated from the transmitting antenna.

Program related data signal. A signal, consisting of a series of pulses representing data, which is transmitted simultaneously with and directly related to the accompanying television program.

Reference black level. The level corresponding to the specified maximum excursion of the luminance signal in the black direction.

Reference white level of the luminance signal. The level corresponding to the specified maximum excursion of the luminance signal in the white direction.

Scanning. The process of analyzing successively, according to a predetermined method, the light values of picture elements constituting the total picture area.

Scanning line. A single continuous narrow strip of the picture area containing highlights, shadows, and half-tones, determined by the process of scanning.

Standard television signal. A signal which conforms to the television transmission standards.

Synchronization. The maintenance of one operation in step with another.

Television broadcast band. The frequencies in the band extending from 54 to 806 megahertz which are assignable to television broadcast stations. These frequencies are 54 to 72 megahertz (channels 2 through 4), 76 to 88 megahertz (channels 5 and 6), 174 to 216 megahertz (channels 7 through 13), and 470 to 806 megahertz (channels 14 through 69).

Television broadcast station. A station in the television broadcast band transmitting simultaneous visual and aural signals intended to be received by the general public.

Television channel. A band of frequencies 6 MHz wide in the television broadcast band and designated either by number or by the extreme lower and upper frequencies.

Television transmission standards. The standards which determine the characteristics of a television signal as radiated by a television broadcast station.

Television transmitter. The radio transmitter or transmitters for the transmission of both visual and aural signals.

Vestigial sideband transmission. A system of transmission wherein one of the generated sidebands is partially attenuated at the transmitter and radiated only in part.

Visual carrier frequency. The frequency of the carrier which is modulated by the picture information.

Visual transmitter. The radio equipment for the transmission of the visual signal only.

Visual transmitter power. The peak power output when transmitting a standard television signal.

## 47 C.F.R. §73.1570

**§ 73.1570 Modulation levels: AM, FM, TV and Class A TV aural.**

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(a) The percentage of modulation is to be maintained at as high a level as is consistent with good quality of transmission and good broadcast service, with maximum levels not to exceed the values specified in paragraph (b). Generally, the modulation should not be less than 85% on peaks of frequent recurrence, but where lower modulation levels may be required to avoid objectionable loudness or to maintain the dynamic range of the program material, the degree of modulation may be reduced to whatever level is necessary for this purpose, even though under such circumstances, the level may be substantially less than that which produces peaks of frequent recurrence at a level of 85%.

(b) Maximum modulation levels must meet the following limitations:

(1) AM stations. In no case shall the amplitude modulation of the carrier wave exceed 100% on negative peaks of frequent recurrence, or 125% on positive peaks at any time.

(i) AM stations transmitting stereophonic programs not exceed the AM maximum stereophonic transmission signal modulation specifications of stereophonic system in use.

(ii) For AM stations transmitting telemetry signals for remote control or automatic transmission system operation, the amplitude of modulation of the carrier by the use of subaudible tones must not be higher than necessary to effect reliable and accurate data transmission and may not, in any case, exceed 6%.

(2) FM Stations. The total modulation must not exceed 100 percent on peaks of frequent reoccurrence referenced to 75 kHz deviation. However, stations providing subsidiary communications services using subcarriers under provisions of § 73.319 concurrently with the broadcasting of stereophonic or monophonic programs may increase the peak modulation deviation as follows:

(i) The total peak modulation may be increased 0.5 percent for each 1.0 percent subcarrier injection modulation.

(ii) In no event may the modulation of the carrier exceed 110 percent (82.5 kHz peak deviation).

(3) TV and Class A TV stations. In no case shall the total modulation of the aural carrier exceed 100% on peaks of frequent recurrence, unless some other peak modulation level is specified in an instrument of authorization. For monophonic transmissions, 100% modulation is defined as  $\pm 25$  kHz.

(c) If a limiting or compression amplifier is employed to maintain modulation levels, precaution must be taken so as not to substantially alter the dynamic characteristics of programs.

## 47 C.F.R. §74.463

**§ 74.463 Modulation requirements.**

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- (a) Each new remote pickup broadcast station authorized to operate with a power output in excess of 3 watts shall be equipped with a device which will automatically prevent modulation in excess of the limits set forth in this subpart.
- (b) If amplitude modulation is employed, modulation shall not exceed 100 percent on negative peaks.
- (c) If frequency modulation is employed, emission shall conform to the requirements specified in § 74.462.

## 47 C.F.R. §78.115

**§ 78.115 Modulation limits.**

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(a) If amplitude modulation is employed, negative modulation peaks shall not exceed 100 percent modulation.



## 47 C.F.R. §87.141

**§ 87.141 Modulation requirements.**

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(a) When A3E emission is used, the modulation percentage must not exceed 100 percent. This requirement does not apply to emergency locator transmitters or survival craft transmitters.

(b) A double sideband full carrier amplitude modulated radiotelephone transmitter with rated carrier power output exceeding 10 watts must be capable of automatically preventing modulation in excess of 100 percent.

(c) If any licensed radiotelephone transmitter causes harmful interference to any authorized radio service because of excessive modulation, the Commission will require the use of the transmitter to be discontinued until it is rendered capable of automatically preventing modulation in excess of 100 percent.

(d) Single sideband transmitters must be able to operate in the following modes:

Carrier mode	Level N(dB) of the carrier with respect to peak envelope power
Full carrier (H3E)	$O > N > -6$ .
Suppressed carrier (J3E)	Aircraft stations $N < -26$ ; Aeronautical stations $N < -40$ .

(e) Each frequency modulated transmitter operating in the band 72.0-76.0 MHz must have a modulation limiter.

(f) Each frequency modulated transmitter equipped with a modulation limiter must have a low pass filter between the modulation limiter and the modulated stage. At audio frequencies between 3 kHz and 15 kHz, the filter must have an attenuation greater than the attenuation at 1 kHz by at least  $40 \log_{10}(f/3)$  db where "f" is the frequency in kilohertz. Above 15 kHz, the attenuation must be at least 28 db greater than the attenuation at 1 kHz.

(g) Except that symmetric side bands are not required, the modulation characteristics for ELTs must be in accordance with specifications contained in the Federal Aviation Administration (FAA) Technical Standard Order (TSO) Document TSO09C91a titled "Emergency Locator Transmitter (ELT) Equipment" dated April 29, 1985. TSO-C91a is incorporated by reference in accordance with [5 U.S.C. 552\(a\)](#). TSO-C91a may be obtained from the Department of Transportation, Federal Aviation Administration, Office of Airworthiness, 800 Independence Avenue SW., Washington DC 20591.

(h) ELTs must use A3X emission and may use A3E or NON emissions on an optional basis while transmitting. Each transmission of a synthesized or recorded voice message from an ELT must be preceded by the words "this is a recording"; transmission of A3E or NON emission must not exceed 90 seconds; and any transmission of A3E or NON emissions must be followed by at least three minutes of A3X emission.

(i) ELTs manufactured on or after October 1, 1988, must have a clearly defined carrier frequency distinct from the modulation sidebands for the mandatory emission, A3X, and, if used, the A3E or NON emissions. On 121.500 MHz at least thirty per cent of the total power emitted during any

transmission cycle with or without modulation must be contained within plus or minus 30 Hz of the carrier frequency. On 243.000 MHz at least thirty percent of the total power emitted during any transmission cycle with or without modulation must be contained within plus or minus 60 Hz of the carrier frequency. Additionally, if the type of emission is changed during transmission, the carrier frequency must not shift more than plus or minus 30 Hz on 121.500 MHz and not more than plus or minus 60Hz on 243.000 MHz. The long term stability of the carrier frequency must comply with the requirements in § 87.133 of this part.

**(j)**Transmitters used at Aircraft earth stations must employ BPSK for transmission rates up to and including 2400 bits per second, and QPSK for higher rates.

**(k)**Universal Access Transceiver transmitters must use F1D modulation without phase discontinuities.

## 47 C.F.R. §95.975

**§ 95.975 CBRS modulation limits.**

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Each CBRS transmitter type must be designed such that the modulation characteristics are in compliance with the rules in this section.

**(a)**When emission type A3E is transmitted with voice modulation, the modulation percentage must be at least 85%, but not more than 100%.

**(b)**When emission type A3E is transmitted by a CBRS transmitter having a transmitter output power of more than 2.5 W, the transmitter must contain a circuit that automatically prevents the modulation percentage from exceeding 100%.

## 47 C.F.R. §101.141

**§ 101.141 Microwave modulation.**

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(a) Microwave transmitters employing digital modulation techniques and operating below 25.25 GHz (except for MVDDS stations in the 12,200-12,700 MHz band) must, with appropriate multiplex equipment, comply with the following additional requirements:

(1) The bit rate, in bits per second, must be equal to or greater than the bandwidth specified by the emission designator in Hertz (e.g., to be acceptable, equipment transmitting at a 20 Mb/s rate must not require a bandwidth of greater than 20 MHz), except the bandwidth used to calculate the minimum rate may not include any authorized guard band.

(i) Stations authorized prior to December 1, 1988 may install equipment after that date with no minimum bit rate. Equipment applied for or authorized prior to April 1, 2005 in the 21.2-23.6 GHz band may be installed with no minimum bit rate.

(ii) However, any digital equipment applied for after April 1, 2005 and equipment replacing existing equipment in the 21.2-23.6 GHz band must meet the bit rate standard.

(2) Equipment to be used for voice transmission placed in service, authorized, or applied for on or before June 1, 1997 in the 2110 to 2130 and 2160 to 2180 MHz bands must be capable of satisfactory operation within the authorized bandwidth to encode at least 96 voice channels. Equipment placed in service, authorized, or applied for on or before June 1, 1997 in the 3700-4200, 5925-6425 (30 MHz bandwidth), and 10,700-11,700 MHz (30 and 40 MHz bandwidths) bands must be capable of satisfactory operation within the authorized bandwidth to encode at least 1152 voice channels. These required loading levels may be reduced by a factor of 1 provided that N transmitters may be operated satisfactorily, over the same radio path, within an authorized bandwidth less than, or equal to, the maximum authorizable bandwidth (e.g., the 1152 channel requirement may be reduced to 576 if two transmitters can be satisfactorily operated over the same path within the maximum bandwidth). Where certificated equipment is designed to operate on the same frequency in a cross polarized configuration to meet the above capacity requirements, the Commission will require, at the time additional transmitters are authorized, that both polarizations of a frequency be used before a new frequency assignment is made, unless a single transmitter installation was found to be justified by the Commission at the time it authorized the first transmitter.

(3)

(i) Except as noted in paragraph (a)(7) of this section, the payload capacity of equipment shall meet the following minimum efficiency standards:

Frequency	Emission bandwidth $\leq$ 5 MHz	Emission bandwidth $>5$ MHz and $\leq$ 20 MHz	Emission bandwidth $>20$ MHz
3,700-10,550 MHz	2.4 bits/second/Hertz	4.4 bits/second/Hertz	4.4 bits/second/Hertz.
10,550-13,250 MHz	2.4 bits/second/Hertz	4.4 bits/second/Hertz	3.0 bits/second/Hertz.

(ii) Traffic loading payload shall exceed 50 percent of payload capacity within 30 months of licensing. During anomalous signal fading, licensees subject to the capacity and loading requirements may adjust to a modulation specified in their authorization if such modulation is necessary to allow licensees to maintain communications, even if the

modulation will not comply with the capacity and loading requirements specified in this paragraph. Links that must comply with the capacity and loading requirements that use equipment capable of adjusting modulation must be designed using generally accepted multipath fading and rain fading models to meet the specified capacity and loading requirements at least 99.95% of the time, in the aggregate of both directions in a two-way link.

**(4)**If a transmitter is authorized to operate in a bandwidth that is not listed in paragraph (a)(3) of this section, it must meet the minimum payload capacity and traffic loading requirements of the next largest channel bandwidth listed in the table; e.g., if the authorized bandwidth is 3.5 MHz, the minimum payload capacity must be 12.3 Mbits/s.

**(5)**Transmitters carrying digital motion video motion material are exempt from the requirements specified in paragraphs (a)(2) and (a)(3) of this section, provided that at least 50 percent of the payload is digital video motion material and the minimum bit rate specified in paragraph (a)(1) of this section is met. In the 6, 10, and 11 GHz bands, concatenation of multiple contiguous channels is permitted for channels of equal bandwidth on center frequencies, provided no other channels are available and the minimum payload capacity requirements are met.

**(6)**Digital systems using bandwidths of 10 MHz or larger will be considered 50 percent loaded when at least 50 percent of their total capacity is being used. For purposes of this subsection, a Fixed Service channel is being used if it is attached to a communications system that is capable of providing data to it at a rate that is sufficient to occupy at least 50 percent of the payload capacity of the Fixed Service channel, after header compression is applied.

**(7)**Equipment placed in service after June 1, 1997 and prior to October 5, 2012 may comply with the provisions of § 101.141(a)(3) in effect as of the date the equipment was placed in service.

**(b)**For purposes of compliance with the emission limitation requirements of § 101.111(a)(2) and the requirements of paragraph (a) of this section, digital modulation techniques are considered as being employed when digital modulation occupies 50 percent or more to the total peak frequency deviation of a transmitted radio frequency carrier. The total peak frequency deviation will be determined by adding the deviation produced by the digital modulation signal and the deviation produced by any frequency division multiplex (FDM) modulation used. The deviation (D) produced by the FDM signal must be determined in accordance with § 2.202(f) of this chapter.

**(c)**Analog Modulation. Except for video transmission, an application for an initial working channel for a given route will not be accepted for filing where the anticipated loading (within five years for voice, or other period subject to reasonable projection) is less than the minimum specified for the following frequency bands. Absent extraordinary circumstances, applications proposing additional frequencies over existing routes will not be granted unless it is shown that the traffic load will shortly exhaust the capacity of the existing equipment. Where no construction of radio facilities is requested, licensees must submit this evidence with their filing of any necessary authority required pursuant to section 214 of the Communications Act and part 63 of this chapter.

Frequency band (MHz)	Minimum number of voice channels (4 KHz or equivalent)
3700 to 4200 (20 MHz bandwidth)	900

<b>Frequency band (MHz)</b>	<b>Minimum number of voice channels (4 KHz or equivalent)</b>
5925 to 6425 (10 MHz bandwidth)	300
5925 to 6425 (20 MHz bandwidth)	600
5925 to 6425 (30 MHz bandwidth)	900
6525 to 6875 (10 MHz bandwidth)	300
10,700 to 11,700 (10 MHz bandwidth)	300
10,700 to 11,700 (20 MHz bandwidth)	600
10,700 to 11,700 (30 MHz bandwidth)	900
10,700 to 11,700 (40 MHz bandwidth)	900

## 47 C.F.R. §101.811

**§ 101.811 Modulation requirements.**

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**(a)**The use of modulating frequencies higher than 3000 hertz for single channel radiotelephony or tone signaling on frequencies below 500 MHz is not authorized.

**(b)**When amplitude modulation is used, the modulation percentage must be sufficient to provide efficient communication and must normally be maintained above 70 percent on positive peaks, but may not exceed 100 percent on negative peaks.

**(c)**When phase or frequency modulation is used for single channel radiotelephony on frequencies below 500 MHz, the deviation arising from modulation may not exceed plus or minus 15 kHz from the unmodulated carrier.

**(d)**Each unmultiplexed radiotelephone transmitter having more than 3 watts plate power input to the final radio frequency stage and initially installed at the station in this service after September 4, 1956, must be provided with a device that will automatically prevent modulation in excess of that specified in paragraphs (b) and (c) of this section which may be caused by greater than normal audio level.